Vol. 12, No. 16
August 31, 1987

Energy Research Abstracts

Abstracts 32446-34453

Office of Scientific & Technical Information
UNITED STATES DEPARTMENT OF ENERGY

CURRENT INFORMATION ON ENERGY

To provide immediate and complete coverage of literature related to major Department programs, the Office of Scientific and Technical Information provides an on-line retrieval system, data bases, and current-awareness publications. The Energy Data Base (EDB), which contains all unclassified, unlimited energy and nuclear related information processed by OSTI since 1974, and the Nuclear Science Abstracts Data Base (NSA), which covers nuclear information from 1948 through June 1976, are available for machine searching using commercial on-line retrieval systems. All information in the publications listed below, plus additional backup information, is included in the EDB. Current information being added to the EDB is available for on-line searching via the OSTI Automated Retrieval System (OARS) accessible to DOE and contractors through the Integrated Technical Information System (ITIS).

The publications described below and access to ITIS/OARS are available to Department of Energy and contractor components from the Office of Scientific and Technical Information, U. S. Department of Energy, P. O. Box 62, Oak Ridge, TN 37831/Telephone (615) 576-1301; FTS 626-1301.

PUBLICATIONS OF THE OFFICE OF SCIENTIFIC AND TECHNICAL INFORMATION

Energy Abstracts for Policy Analysis (EAPA)

A monthly abstract journal devoted to the analysis of energy research, conservation, and policy. Scope and coverage are limited to substantive articles or reports and emphasize legislative, regulatory, and other legal aspects, as well as social, economic, and environmental impacts. *EAPA* is available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. The annual subscription price is $63.00 for domestic (North America) or $78.75 for foreign (outside North America) subscribers; a single issue is $6.00 or $7.50, respectively.

Energy Research Abstracts (ERA)

A comprehensive semimonthly abstract journal devoted to all areas of energy-related information produced by the Department of Energy, other U. S. government organizations, and foreign governments. *ERA* is available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. The annual subscription price for the 24 issues is $146.00 for domestic (North America) subscribers or $182.50 for foreign (outside North America) subscribers. A single issue is $14.00 or $17.50, respectively.

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Energy Meetings (EM)

A monthly listing of conferences, symposia, workshops, etc., pertaining to DOE's programmatic interests. *EM* is available on subscription (use PB87-901500) from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. The annual subscription price is $70.00 for domestic subscribers and $140.00 for subscribers outside the North American continent; a single issue is $8.00 and $16.00, respectively.

The following semimonthly bulletins are also available from the National Technical Information Service. The annual subscription rate for one volume (calendar) year (24 issues; no indexes) is $80.00 for domestic (North America) and $160.00 for foreign (outside North America) subscribers; use the identifying order number (PB- No.) when subscribing.

Acid Precipitation (APC)–**PB87-901000.** Acid precipitation, including effects and possible control measures.

Buildings Energy Technology (BET)–**PB87-900700.** Technology required for energy conservation in buildings of all types.

Coal-Based Synfuels (CBS) PB87-901400. Conversion of coal into gaseous or liquid fuels.

Coal Combustion and Utilization (CCU)–**PB87-914400.** Coal combustion, including fluidized bed combustion, and direct utilization of coal for power generation, fuel cells, and MHD generators.

Coal Preparation and Pollution Control (CPC)–**PB87-900800.** Coal preparation and cleaning and reducing pollution from its direct combustion.

Direct Energy Conversion (DEC)–**PB87-946600.** Photovoltaics, magnetohydrodynamics, electrohydrodynamics, thermoelectrics, thermionics, and fuel cells.

Energy from Biomass (EFB)–**PB87-900600.** Biomass production, conversion, and utilization for energy.

Geothermal Energy Technology (GET)–**PB87-914700.** Exploration, development, and utilization of geothermal resources.

Heavy-Ion Reactions (HIR)–**PB87-900500.** Heavy-ion ($A > 4$) reactions.

Laser Research (LAR)–**PB87-901100.** Laser research and development, excluding applications.

Nuclear Fuel Cycle (NFC)–**PB87-913400.** Both front and back ends of the nuclear fuel cycle.

Nuclear Reactor Safety (NRS)–**PB87-913500.** Accident analysis, safety systems, radiation protection, decommissioning and dismantling, and security measures.

Radioactive Waste Management (RWM)–**PB87-902900.** Management aspects of transport and storage, waste processing, waste disposal, waste storage, radioactive effluents, and shipping containers.

Solar Thermal Energy Technology (STT)–**PB87-901200.** Research and development of efficient and reliable solar thermal conversion systems.

Transportation Energy Research (TER)–**PB87-900900.** Energy-efficient advanced automotive propulsion systems and transportation energy conservation.

Unconventional Petroleum (UCP)–**PB87-901300.** Secondary and tertiary recovery of petroleum and oil shales and tar sands.

INTERNATIONAL ENERGY PUBLICATIONS

The Office of Scientific and Technical Information (OSTI) cooperates in the publication of international abstract journals with the following: (1) International Atomic Energy Agency, International Nuclear Information System, Vienna, Austria, for *Atomindex;* (2) International Energy Agency, Biomass Conversion Technical Information Service, Dublin, Ireland, for *Biomass Abstracts;* and (3) International Energy Agency, IEA Coal Research, London, England, for *Coal Abstracts.* In each case, the cognizant foreign agency provides the non-U. S. information to OSTI for inclusion in the Energy Data Base; in turn, OSTI provides the U. S. information for input into the respective journal.

Atomindex

A semimonthly abstract journal providing worldwide coverage of information on nuclear science and technology. *Atomindex* is available by subscription from Bernan Associates UNIPUB, 10033-F King Highway, Lanham, MD 20706. The cost of an annual subscription, 24 semimonthly issues and semiannual and annual cumulative indexes, is $355.

Biomass Abstracts

A bimonthly abstract journal with comprehensive coverage of information on the conversion of biomass to energy. *Biomass Abstracts* is available free to DOE components and contractors from OSTI. Non-DOE organizations may obtain *Biomass Abstracts* from Biomass Conversion Technical Information Service, Institute for Industrial Research and Standards, Ballymun Road, Dublin 9, Ireland, for 60 IR pounds per year for participating countries and 90 IR pounds per year for nonparticipating countries. Make checks payable to the Institute.

Coal Abstracts

A monthly abstract journal providing comprehensive worldwide coverage of information in the field of coal science and technology. *Coal Abstracts* is available to DOE components and contractors from OSTI. Non-DOE organizations may obtain *Coal Abstracts* from IEA Coal Research, Technical Information Service, 14-15 Lower Grosvenor Place, London SW1W 0EX, England, for 110 pounds sterling per year.

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ENERGY RESEARCH ABSTRACTS

ABOUT THE OFFICE OF SCIENTIFIC AND TECHNICAL INFORMATION

The Office of Scientific and Technical Information (OSTI) in Oak Ridge, Tennessee, has been the national center for scientific and technical information for the Department of Energy (DOE) and its predecessor agencies since 1946. In developing and managing DOE's technical information program, OSTI places under bibliographic control not only DOE-originated information but also worldwide literature on scientific and technical advances in the energy field and announces the source and availability of this information. Although the literature of science is emphasized, coverage extends to DOE programmatic, socioeconomic, environmental, legislative/regulatory, energy analysis, and policy-related areas. To accomplish the mission of furnishing centralized support for Departmental elements in managing their scientific and technical information, OSTI builds and maintains computerized data bases and disseminates information via computerized retrieval systems and announcement publications such as abstract journals, bibliographies, and bulletins. Direct access to OSTI's Energy Data Base (EDB) and Nuclear Science Abstracts Data Base (NSA) is available to the U. S. scientific community through commercial on-line retrieval systems. Access to these data bases from outside the United States is available only through formal exchange agreements. The current-year EDB records, DOE Research-In-Progress, and various other specialized DOE data bases are available to DOE offices and contractors and other government agencies through the OSTI Automated Retrieval System (OARS), which is a major component of the Integrated Technical Information System (ITIS). In addition to providing access to the OSTI on-line systems, ITIS serves as a gateway to other government and commercial systems and provides information merging for customized information products. The Office of Scientific and Technical Information has developed systems to record and communicate energy-related research-in-progress information, to track research report deliverables from DOE contractors, to test and make available DOE-funded computer software programs with scientific and management applications, and to produce special publications in support of DOE program offices. To manage DOE's technical information resources effectively, OSTI's program is one of continual development and evaluation of new information products, systems, and technologies.

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Energy Research Abstracts (ERA) provides abstracting and indexing coverage of all scientific and technical reports, journal articles, conference papers and proceedings, books, patents, theses, and monographs originated by the U. S. Department of Energy, its laboratories, energy centers and contractors. *ERA* also covers other energy information prepared *in report form* by federal and state government organizations, foreign governments, and domestic and foreign universities and research organizations. The user should remain aware that *ERA* coverage of non-report literature is limited to that generated by Department of Energy activity.

ERA is comprehensive in its subject scope, encompassing the DOE's research, development, demonstration, and technological programs resulting from its broad charter for energy sources, supplies, safety, environmental impacts, and regulation.

ERA is available on an exchange basis to universities, research institutions, industrial firms, and publishers of scientific information. Inquiries should be directed to the Office of Scientific and Technical Information, P. O. Box 62, Oak Ridge, TN 37831.

ERA is available to the public on a subscription basis from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. The subscription rate for the 24 semimonthly issues is $146.00 for domestic subscribers and $182.50 for foreign subscribers. A single issue costs $14.00 (domestic) or $17.50 (foreign). The cumulative indexes will be available in printed form from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. The GPO Stock Number is 061-000-00697-4 and the price is $142.00 for the Volume 11 indexes. The cumulative indexes are also available in microfiche form from the National Technical Information Service, U. S. Department of Commerce, Springfield, VA 22161.

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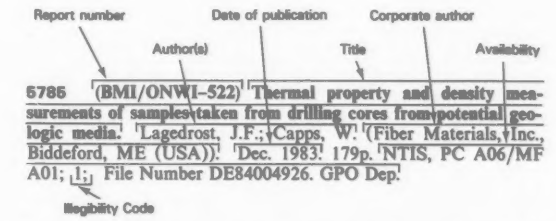
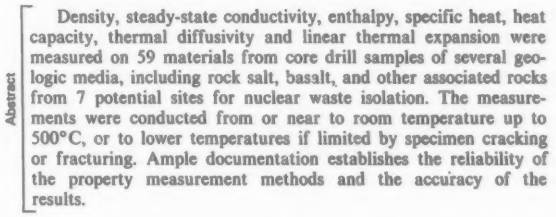
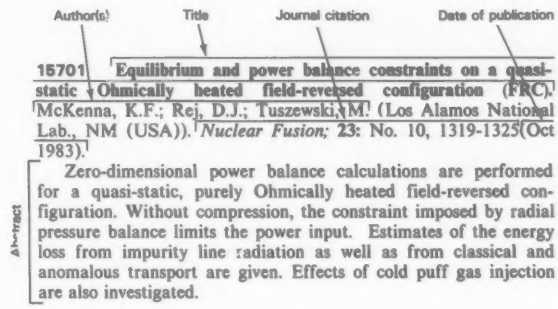
The principal elements of abstract entries for a typical research and development report and a typical technical journal article are illustrated below.


Report number
Date of publication
Corporate author
Author(s)
Title
Availability
5785 (BMI/ONWI-522) Thermal property and density measurements of samples taken from drilling cores from potential geologic media. Lagedrost, J.F.; Capps, W. (Fiber Materials, Inc., Biddeford, ME (USA)). Dec. 1983. 179p. NTIS, PC A06/MF A01; ; File Number DE84004926. GPO Dep.
Illegibility Code


Abstract
Density, steady-state conductivity, enthalpy, specific heat, heat capacity, thermal diffusivity and linear thermal expansion were measured on 59 materials from core drill samples of several geologic media, including rock salt, basalt, and other associated rocks from 7 potential sites for nuclear waste isolation. The measurements were conducted from or near to room temperature up to 500°C, or to lower temperatures if limited by specimen cracking or fracturing. Ample documentation establishes the reliability of the property measurement methods and the accuracy of the results.


Author(s)
Title
Journal citation
Date of publication
15701 Equilibrium and power balance constraints on a quasi-static Ohmically heated field-reversed configuration (FRC). McKenna, K.F.; Rej, D.J.; Tuszewski, M. (Los Alamos National Lab., NM (USA)). Nuclear Fusion; 23: No. 10, 1319-1325 (Oct 1983).
Abstract
Zero-dimensional power balance calculations are performed for a quasi-static, purely Ohmically heated field-reversed configuration. Without compression, the constraint imposed by radial pressure balance limits the power input. Estimates of the energy loss from impurity line radiation as well as from classical and anomalous transport are given. Effects of cold puff gas injection are also investigated.

INDEXES TO *ENERGY RESEARCH ABSTRACTS*

Five indexes are provided for approaching the contents of each issue of *Energy Research Abstracts (ERA)*. Each index is preceded by an introduction that details the organization of the index and the principles by which it was compiled. The reader is referred to these introductions for information not found in the index examples that follow.

• Corporate Author Index

Technical report literature is indexed using the name of the organization or institution responsible for the issuance of the report.

5785 (BMI/ONWI-522) Thermal property and density measurements of samples taken from drilling cores from potential geologic media. Lagedrost, J.F.; Capps, W. **(Fiber Materials, Inc., Biddeford, ME (USA)).** Dec. 1983. 179p. NTIS File Number DE84004926. GPO Dep.

is indexed as:

Fiber Materials, Inc., Biddeford, ME (USA)

• Personal Author Index

Each author's name is indexed in the form appearing on the document abstracted, with the exception that given names are reduced to initials:

Capps, W., *See* Lagedrost, J. F.
Lagedrost, J.F., Thermal property and density measurements of samples taken from drilling cores from potential geologic media, 9:5785 (R;US)
McKenna, K.F., Equilibrium and power balance constraints on a quasi-static Ohmically heated field-reversed configuration (FRC), 9:15701 (J;US)
Rej, D.J., *See* McKenna, K.F.
Tuszewski, M., *See* McKenna, K.F.

• Subject Index

The subject index consisting of entries naming specific materials, objects, and processes is arranged alphabetically. Document titles, informative phrases, or both specific to these entries are arranged alphabetically under the entries.

SALT DEPOSITS
Density
Thermal property and density measurements of samples taken from drilling cores from potential geologic media, 9:5785 (R;US)
REVERSED-FIELD PINCH
Energy Balance
Equilibrium and power balance constraints on a quasi-static Ohmically heated field-reversed configuration (FRC), 9:15701 (J;AT)

• Contract Number Index

DOE technical report literature is indexed using contract numbers. This index contains the contract number with corresponding abstract and report numbers.

AC06-76RL01830 **Fiber Materials, Inc., Biddeford, ME (USA)** 9:5785 BMI/ONWI-522

• Report Number Index

Technical report literature is also indexed using report numbers. This index includes information on where individual reports may be obtained. Patents and conference papers are indexed here as a matter of convenience. When a report is supplied under a File Number, that number is included in the availability statement. A file number–report number correlation is included for convenience.

BMI/ONWI-522 9:5785 NTIS, PC A09/MF A01. File Number DE84004926, Distribution Category MN-70

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CEA Centre d'Etudes de Saclay
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Karlsruhe, Federal Republic of Germany

IEA Biomass Conversion Service
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SUBJECT CONTENTS (NUMERICAL LISTING)

Six-digit subject category numbers are used in the storage, retrieval, and manipulation of bibliographic information entered into DOE's computerized bibliographic information system. The six-digit category numbers are utilized as if they were three pairs of two-digit numbers, the first two pairs being used to arrange the abstract content of *Energy Research Abstracts*. The following listing includes the totality of the 40 first-level and 289 second-level subject categories used. Because each issue of *ERA* announces only those documents becoming available during a semimonthly period, some subject categories may not be represented in every issue. The complete subject category scheme with scope definitions and limitations is available as DOE/TIC-4584-R6 from NTIS for $9.50.

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REFER ALSO TO CITATION(S) 32462

32446 (DOE/PC/80514—07) Chemistry and reactivity of micronized coals: Technical progress report No. 7. Lloyd, W.G.; Riley, J.T.; Kuehn, K.W.; Kuehn, D.W. (Western Kentucky Univ., Bowling Green (USA)). 15 May 1987. Contract FG22-85PC80514. 49p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87010434.

This project examines the effect of ultrafine milling of mid-rank coals (to mean size below 10 microns) upon their physical and chemical properties. A systematic review of variables for two laboratory stirred-ball slurry attritor mills used for milling -60 mesh coal dispersed in deionized water has been completed. Optimum milling conditions are: 40% V/V coal about 46% W/V), 140 cc slurry/kg media, 60 seconds milling time, agitator shaft speed 290 rpm, and 1/4-inch diameter stainless steel media. Under these conditions the energy requirement is in the range of 6.5 to 7.0 kwh/ton of coal. Milling times greater than eight minutes lead to compressive collapse of coal micropore structure, leading to decreased reactivity of the milled product. Since most attrition occurs within the first few minutes, the energy investment in milling beyond eight minutes (50 to 55 kwh/ton) is unacceptably high. Sources of error in wet sieve analysis, including sample inhomogeneity, incomplete rinse-through, and drying, have been reduced significantly in a developed procedure using a 3-inch wet sieve system, 3600 Hz sonication, and intermittent vacuum pulses. The procedure yields sieve analysis data for milled coals and -10 micron fractions used for particle size analysis with the Spectrex near-angle diffraction analyzer. Tests on eight coals with the hardgrove grindability machine, using extended grinding times, show poor agreement between the Hardgrove Grindability Indexes of the coals and their pulverizability, as measured by the rate of production of -200 mesh material. There is good agreement between the Hardgrove Indexes and the amount of -30/+60 mesh material produced. 19 refs., 10 figs., 9 tabs.

32447 (NZERDC-P—97) Rates of drying of four south island lignites. Carr, R.M.; Vickers, M. (Otago Univ., Dunedin (New Zealand). Dept. of Chemistry; New Zealand Energy Research and Development Committee, Auckland). Jul 1986. 24p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87900750.

Some Central Otago and Southland Lignites have been subjected to drying tests. Wet samples of coal from 4 localities have been exposed to circulating air at controlled temperatures and known relative humidities for periods of up to 7 hours. Drying rates at 22.5°C for all samples are compared and the effects of humidity, temperature, and particle size are shown for one sample. Drying behaviour is similar for all samples and the data show that most of the water can be removed within a few hours at relatively low temperatures. 7 refs., 5 figs., 6 tabs.

32448 (PB—87-168407/XAB) Bench-scale performance testing and economic analyses of electrostatic dry coal cleaning. Final report, October 1980-July 1983. Rich, S.R. (Advanced Energy Dynamics, Inc., Natick, MA (USA)). Feb 1987. 158p. NTIS, PC A08/MF A01.

The report gives results of preliminary performance evaluations and economic analyses of the Advanced Energy Dynamics (AED) electrostatic dry coal-cleaning process. Grab samples of coal-feed-product coals were obtained from 25 operating physical coal-cleaning (PCC) plants. These samples were analyzed for ash, sulfur, and energy content and splits of the original samples of feed run-of-mine coal were provided for bench-scale testing in an electrostatic separation apparatus. The process showed superior sulfur-removal performance at equivalent cost and energy-recovery levels. The ash-removal capability of the process was not evaluated completely: overall, ash-removal results indicated that the process did not perform as well as the PCC plants.

0104 Processing

REFER ALSO TO CITATION(S) 32608, 33166

32449 (DOE/CE/50070—H1) Synthetic Fuel Center construction and alternative test fuels production: Final report, 7 June 1982 to 7 September 1985. Sefer, N.R.; Erwin, J.; Russell, J.A. (USDOE Assistant Secretary for Conservation and Renewable Energy, Washington, DC. Office of Vehicle and Engine Research and Development). Sep 1985. Contract AC01-84CE50070. 211p. NTIS, PC A10/MF A01; 1; GPO Dep. File Number DE87010332.

The Synthetic Fuel Center has been established by the Department of Energy as part of the Alternative Fuels Utilization Program. The main function is to provide test fuels in 5-gallon to 500-gallon quantities for research projects on utilization of alternative fuels. In the three-year report period, 26 fuels were prepared for 11 projects. Quantities ranged from 50 to 200 gallons of each fuel; the total production was 2490 gallons. Starting materials for processing or blending included two shale oils, two shale-derived naphthas, and two coal-derived middle distillates. A hydrogenation pilot plant was installed for processing synthetic feedstocks from oil shale and coal. Moderate severity upgrading of shale oil is reported, and the unit is capable of intermediate to high severity conversion of shale oil and coal liquids. Catalytic reforming of shale-derived naphthas at low pressure raised the octane of these paraffinic materials from less than 50 to above 90 Research Octane Number. Processing capabilities include distillation, adsorption, filtration, and centrifuging. Storage tanks from 500-gallon to 10,000-gallon capacity were installed. These are connected through piping and a manifold to the processing unit and other tanks for storage or blending. Fuel blending to target properties or compositions was a major activity. Complete characterizations were made of all feedstocks and products.

32450 (DOE/ER/60215—T2) [Separations of non-volatile components of fossil fuels at very high resolution and their structural characterization: Progress report]. (Indiana Univ., Bloomington (USA)). [1986]. Contract FG02-84ER60215. 4p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010791.

The most significant instrumental development of this grant period has been the design and evaluation of a unique spectrofluorometric system based on the photodiode array technology. This high-sensitivity, multi-channel, miniaturized detector may be used for both microcolumn liquid chromatography and capillary supercritical fluid chromatography. The hardware, optical system, and computational capabilities for data storage and display are quite unique. The system was fully evaluated for polycyclic aromatics, azaarenes, phenolics, and other compounds extracted from various fossil fuels. High sensitivity, adequate spectral resolution, and tunable selectivity make this device a very complementary tool for structural elucidation of natively fluorescent molecules. During the aforementioned studies on azaarene and phenolic mixtures, the photodiode fluorescence system was found to be useful in a number of instances where the molecular shape was in question. However, the lack of standard compounds within the high molecular-weight polycyclics remains a serious problem in assigning the correct struc-

tures. The details of the detector design features, operational parameters, performance characteristics, and applications can be found in the references given.

32451 **(DOE/METC—86/0240) Morgantown Energy Technology Center technology status report: Systems studies and combustion research for coal-fueled heat engines.** (USDOE Morgantown Energy Technology Center, WV). Aug 1985. 71p. NTIS, PC A04/MF A01; GPO Dep. File Number DE86006616.

Significant accomplishments during FY 84 include completion of a series of bench-scale combustion tests on CWF's (coal-water fuel) of varying ash levels and compositions, development of an alkali and particulate sampling technique for field application on hot-cleaned coal-derived gas and gas combustion experiments, preliminary laboratory measurements of deposition-related sticking coefficients for coal ash, development of a unique technique for the study of coal-water droplet disruption and evaporation phenomena, and systems analysis and sensitivity studies on several direct coal-fired gas turbine concepts.

32452 **(DOE/PC/50031—T5) Development of a solid/liquid/gas phase fraction meter: Final report.** Bernatowicz, H.; Gansmiller, D.; Wolff, S. (Science Applications International Corp., Sunnyvale, CA (USA)). 25 Feb 1987. Contract AC22-82PC50031. 139p. NTIS, PC A07/MF A01. File Number DE87006449.

A non-intrusive phase fraction meter was developed for use at the preheater exit of the Solvent Refined Coal facility in Wilsonville, Alabama. The objective was to develop instrumentation that could continuously monitor in real-time the ratio of solids to gas to liquid in the techniques to perform the measurement. The project was performed in three phases; the goals for each phase are (1) Perform sensitivity studies to establish the ultimate accuracy of various measurement techniques and determine the effects of unknown variations in the process stream on the instrument response. (2) Based on the results of Phase I, design and fabricate a prototype gage along with control and analysis software. The components were integrated and the instrument calibrated and tested in the laboratory using simulants for the operation of the instrument on site at the Wilsonville SRC-1 plant in Alabama. The techniques used for the measurement are a combination of high- and low energy gamma densitometry. Simulation studies performed in Phase I showed that, with the present knowledge of the process stream, no instrument could distinguish well between unreacted coal and liquid present in the mixture at the point of measurement. Thus solid fraction was taken to be the ash only. The instrument was installed and tested at Wilsonville in normal plant operating conditions and over a series of special test conditions. The applicability of this technique to the severe environmental and process conditions of coal derived synfuels was demonstrated. The gauge is operational with a preliminary calibration. Further work is required to refine the calibration and to gain operating experience over a wider range of plant conditions.

32453 **(DOE/PC/50806—T3) Small angle x-ray studies and modeling of coal gasification.** Jensen, K.F.; Foster, M.D.; Reyes, S. (Minnesota Univ., Minneapolis (USA). Dept. of Chemical Engineering and Materials Science). Jul 1986. Contract FG22-82PC50806. 111p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE86013611.

This report describes advances made in the characterization and modeling of porous solids with particular emphasis on issues relevant to char gasification. The experimental investigation revolves around small angle x-ray scattering (SAXS). A new, fully penetrable polydisperse spheres model developed for interpreting SAXS data from porous structures had advantages over the classical estimates by Guinier and Porod. Comparisons to a cell model based on Voronoi tessellation are also made. Model carbon experiments with CARBOSIEVE-S demonstrate the usefulness of SAXS in monitoring internal structural changes in carbonaceous material during gasification. Four PSOC samples studied by SAXS revealing increases in pore sizes and changes in surface area during pyrolysis and subsequent gasification. A high temperature cell for SAXS is developed and tested to 500°C in pyrolysis investigations. The modeling studies aim at developing a pore model capable of representing the evolution of porous structures during gasification. By using concepts from percolation theory, a general framework is formulated that incorporates reaction and transport process in changing pore structures. A new technique for evaluating effective transport coefficients in porous solids avoids the use of empirical tortuosity factors and model predictions are in good agreement with published experimental data. The percolation based approach is used to model pore opening, enlargement, and particle disintegration during gasification of a single char particle in the kinetic and diffusion limited regimes. Because of the detailed treatment of basic topological features of the internal pore structure, the model is able to predict experimental observations for a variety of conditions. The results are expected to have wide applications in gas-solid reaction characterization and analysis. 96 refs., 39 figs., 7 tabs.

32454 **(DOE/PC/71257—T10) Novel experimental studies for coal liquefaction: Quarterly progress report, January 1, 1987 to March 31, 1987.** Holder, G.D.; Shah, Y.T.; Tierney, J.W. (Pittsburgh Univ., PA (USA)). 1987. Contract FG22-84PC71257. 55p. NTIS, PC A04/MF 01; 1; GPO Dep. File Number DE87010078.

Work during the quarter was devoted primarily to investigating the kinetics of the two-step process for conversion of synthesis gas to methanol. The synthesis consists of two sequential reactions. The first is the carbonylation of methanol to methyl formate and the second is the hydrogenation of methyl formate to two molecules of methanol, thus regenerating the methanol used in the carbonylation step and producing one molecule of product. The reactions can be carried out separately or they can occur simultaneously in the same reactor. Each method has advantages and disadvantages. Supercritical fluid extraction is an attractive process primarily because the density and solvent power of a fluid changes dramatically with pressure at near critical conditions, and during the extraction of coal, the density of a supercritical fluid should also change the extractability of the coal. During earlier quarters a non-reacting supercritical fluid, toluene, was studied to determine the effect of density on the coal extraction/reaction process. Extractions were carried out for 2 to 60 minutes at reduced densities between 0.5 and 2.0 and at temperatures between 647 and 698 K. The data obtained can be explained by the hypothesis that coal dissolution is required preceding liquefaction reactions and that the degree of dissolution depends upon solvent density and temperature. A kinetic model shows that higher solvent densities result in faster conversion rates and in higher total conversions. A second factor that makes supercritical extraction attractive is high mass transfer rates. At high pressures, mass transfer rates in a supercritical fluid are much higher than in a liquid, despite the fact that the supercritical fluid has liquid-like solvent powers.

32455 **(DOE/PC/91272—T7) Mechanism of extraction and desulfurization of coals with alcohols: Final report, March 1, 1986-February 28, 1987.** Muchmore, C.B.; Kent, A.C.; Smith, G.V.; Phillips, J.B.; Hinckley, C.C. (Southern Illinois Univ., Carbondale (USA). Coal Extraction and Utilization Research Center). May 1987. Contract FC22-86PC91272. 49p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87009877.

The desulfurization of coal by reaction with alcohols was studied under a variety of reaction conditions, employing several different reactor systems. The carbon monoxide/ethanol reaction system was investigated, and various reducing agents were compared with iron sulfide. In addition, the effects of the radical initiators NO and O_2 were evaluated. In a batch reactor system, the sulfur removal obtained was correlated with reaction pressure and conversion of the coal to gaseous and liquid products. Sequential reaction with alcohol enhanced removal of the remaining organic sulfur; total sulfur concentrations of less than 0.5% were attained with both Illinois No. 5 and No. 6 seam coals. Comparison of changes in elemental analyses and the composition of the gaseous products are consistent with FTIR analyses. The activation energy of the methanol/KOH reaction system was determined. Experiments were also conducted with petroleum coke, and in systems where the mineral pyrite was mixed with graphite and reduced with ethanol.

32456 (DOE/PC/91272—T8) Electrochemical desulfurization of coal slurries: Reaction rate studies: Annual report, March 1, 1986-February 28, 1987. Lalvani, S.B.; Wapner, P. (Southern Illinois Univ., Carbondale (USA). Coal Extraction and Utilization Research Center). May 1987. Contract FC22-86PC91272. 14p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009876.

The mechanism of sulfur removal from coal by electrolysis was investigated. The reaction rate constants for coal and pyrite oxidation are reported. Included are the results of surface studies of pyrite electro-oxidation. A number of characterization techniques such as Hall effect measurements, resistivity determination, and SEM were also employed in this work.

32457 (EPRI-AP—5165) Characterization of coal pyrolysis liquids: Final report. Hill, G.R.; Meuzelaar, H.L.C.; Hoesterey, B.L. (Utah Univ., Salt Lake City (USA); Electric Power Research Inst., Palo Alto, CA (USA)). Apr 1987. 80p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920385.

In order to characterize coal-pyrolysis liquids, fresh tar samples were collected from a fixed-bed Wellman-Galusha gasifier. The tars were produced from a range of western US coals (hvBb and hvCb bituminous, subbituminous, and lignite). Extensive precautions were then taken in order to minimize oxidative and other regressive reactions. The tars were subjected to an extensive array of chromatographic, spectroscopic, and conventional techniques. Samples of the corresponding feed coals are also under characterization. After data reduction, the results were correlated and compared with conventional tar-characterization data. From the data, it was seen that tar yield increased with coal rank (from 6.1 wt % for the lignite to 17.4% for the hvBb bituminous coal). The nature of the tars was also a function of coal rank. The hvBb bituminous-coal tar had the highest hydrocarbon fraction, which was dominated by 2-ring aromatic and hydroaromatic compounds. The lignite tar was entirely dominated by hydroxyaromatics, making it highly reactive and susceptible to retroagressive reactions. Direct comparison of the low-voltage Py-MS (pyrolysis-mass spec) data of the feed coals with the low-voltage MS data of the corresponding coal tars showed a high degree of similarity. Thus, a predicative capability of coal-tar quality and quantity exists with these analytical techniques. 12 refs., 20 figs., 18 tabs.

32458 (EPRI-AP—5222) Coal pretreatment with carbon dioxide and water: Effects on North Dakota lignite and Utah coal: Final report. Slegeir, W.; Sanchez, J.; Coughlan, R.; Sapienza, R.; Butcher, T.; Healy, F. (Brookhaven National Lab., Upton, NY (USA); Electric Power Research Inst., Palo Alto, CA (USA)). May 1987. Contract AC02-76CH00016. 43p. NTIS, PC A03/MF A01 - Research Reports Center, Box 50490, Palo Alto, CA 94303; 1; GPO Dep. File Number DE87010290.

This project examines the results of employing batch treatments of aqueous carbon dioxide on two low-rank coals: (1) a North Dakota lignite, and (2) a Utah subbituminous. Such treatments were evaluated in terms of the changes in slurry-relevant characteristics, such as equilibrium moisture, ash content and composition, grindability and slurry rheology, for these coals. Treatment conditions ranged between 30° and 80°C, and 800 and 1200 psi. These treatments afforded appreciable decreases in the equilibrium moisture and ash contents of the North Dakota lignite, but smaller decreases were observed with the Utah subbituminous coal. Both coals showed some improvements in grindability. Some improvements in slurry rheology were also observed for the North Dakota lignite. For both coals, the treatment generally leads to changes in the direction that improve their qualities as feedstocks for coal gasification systems. The results of this project are consistent with the mechanism of CO_2/H_2O treatments involving an ion-exchange process. By this ion-exchange process, basic components are exchanged with the hydronium ion of the CO_2/H_2O mixture, and such exchange may lead to other changes in the coal matrix.

32459 The Great Plains coal gasification project status. Bodnaruk, B.J. (Dept. Technical Monitor, U.S. Dept. of Energy, Chicago Operations Office, Argonne, IL 60439). *Journal of Engineering for Gas Turbines and Power;* **108**: No. 3, 432-439(Jul 1986).

The Great Plains Gasification Project is the first commercial-sized plant to produce substitute natural gas from coal in the United States. The plant is designed to convert 14,000 tons/D of North Dakota lignite into 137.5 million standard cubic feet of gas per day. The plant construction has been successfully completed per original design, on schedule and on budget. The plant has also been successfully turned over from construction to operations, as per the original plan. With the completion of the capital projects being implemented at the plant, plans are to achieve 70 percent stream factor in the first year of production (1985). The DOE-Chicago Operations Office has been assigned the responsibility for monitoring the project's performance against baselines of cost, schedule, and technical criteria. During the startup phase of the project, significant technological advancements have been made and considerable knowledge has been gained, both by the operators and DOE (considering this to be a first of a kind plant built in the U.S.).

32460 Influence of coal properties on forward combustion in laminar flow. Lockwood, W.R.; Corlett, W.R.; Mortazaui, H.R.; Emery, A.F. (Dept. of Mechanical Engineering, Univ. of Washington, Seattle, WA). *Journal of Engineering for Gas Turbines and Power;* **108**: No. 3, 440-445(Jul 1986).

Numerical results are presented for forward combustion in coal channels wherein the flow is laminar. The work is motivated by the need to describe deviations from ideal permeative flow characteristics in theoretical models of underground rubble gasification. For simplicity, the geometry is idealized to a straight circular channel of initially uniform diameter. Coal and inlet gas properties, as well as gas flow rate and initial channel diameter, are arbitrary. A baseline case, in which O/sub 2/-steam is injected into a channel in virgin coal, is chosen to match laboratory work reported by other investigators. The results of independent variation of six major parameters are also shown. Finally, representative results are presented for injection of a hot mixture of steam and gasification products into hot char.

0105 By-products

REFER ALSO TO CITATION(S) 32501

0106 Properties

REFER ALSO TO CITATION(S) 32450, 32453

32461 (DOE/PC/80537—T1) Use of generator produced neutrons in coal analysis: Quarterly report, December 16, 1986-March 15, 1987. Thorpe, A.N.; Senftle, F.E.; Mikesell, J.L. (Howard Univ., Washington, DC (USA). School of Engineering; Geological Survey, Reston, VA (USA)). 1987. Contract FG22-85PC80537. 5p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010183.

The results obtained in the previous report period indicate the desirability of using the D,D generator to obtain a spectrum in using 2.5 MeV neutrons. In a previous report (June 16, 1986 to September 14, 1986), it was pointed out that, in order to use the same electronics normally used for the D,T neutron generator with the D,D neutron generator, certain modifications would have to be made. In this report we have addressed these problems including the reservoir control circuit, construction of an adaptor to use unpotted D,D tubes in the borehole probe, and measurement of the 2.5 MeV flux.

32462 (DOE/PC/91272—T9) Microcrystalline iron sulfide particles in coal: A Moessbauer study: Final report, March 1, 1986-February 28, 1987. Hinckley, C.C.; Smith, G.V.; Saporoschenko, M. (Southern Illinois Univ., Carbondale (USA). Coal Extraction and Utilization Research Center). May 1987. Contract FC22-86PC91272. 16p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009875.

This report presents progress achieved in the first eight months of a continuing project. In this time, new equipment has been installed and tested, and preliminary experiments on all sample types to be investigated have been completed. Collection of data

for iron sulfide standards and for one microcrystalline iron oxide sample is nearly complete. Analyses of the data are in progress. The objective of this research project is to employ Moessbauer spectroscopy to examine microcrystalline iron sulfides in coal chars to determine the extent to which highly dispersed iron sulfide catalysts may be present in the chars. The Moessbauer spectrometer used in this project is a Ranger Scientific MS-900. All the data have been collected in a symmetric mode at velocities of 9.8 mm/s and 11.3 mm/s. Low temperatures (4.3K) are obtained with a liquid He dewar made by Lakeshore Cryotronic. A typical low-temperature experiment lasts about 7 days. The Moessbauer spectra are analyzed using the program MOSFIT, which employs an iterative least-squares fitting method to find the best fit of Lorentzian functions to the experimental spectrum. Fourier smoothing techniques are employed. Analysis of the spectra of two char samples indicates that the concentration of iron sulfides is small. Superparamagnetism in the char spectra is evident; however, particle size estimates will be obtained. One of the standard samples of iron oxide was studied at different temperatures. The blocking temperature for the preparation of this sample is between 9.6 and 24K. Particle size estimates are between 94 and 128 A. 10 refs., 7 figs.

32463 **(DOE/PC/91272—T10) Mixing of sulfur between pyritic and organic phases during coal conversion processes: Annual final report, March 1, 1986-February 28, 1987.** Dunkerton, L.V.; Nigam, A.; Mitra, S.; Phillips, J.B.; Smith, G.V.; Wiltowska, T. (Southern Illinois Univ., Carbondale (USA). Coal Extraction and Utilization Research Center). May 1987. Contract FC22-86PC91272. 42p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87009873.

In preparation for using ^{33}S NMR for characterization of organic sulfur types in coal, previously prepared substituted dibenzothiophene model compounds were converted to their corresponding sulfones and their sulfur-33 nmr recorded. The sulfur-33 NMR spectra of dibenzothiophene-5,5-dioxide (2), 2-(p-methylphenylsulfonyl) dibenzothiophene-5,5-dioxide (4), and 2-(methylsulfonyl) dibenzothiophene-5,5-dioxide (5) are reported. The chemical shifts were in the +2 to -21 ppM range. The line widths ranged 70 to 200 Hz. The changes in ^{13}C chemical shift experienced by aromatic carbons upon oxidizing the sulfide to its sulfone were also studied and the data used to identify which sulfone was formed in multiple thioether-containing aromatics after partial oxidation. Continuing results on the use of the substituted dibenzothiophenes to monitor mixing of sulfur between pyritic and organic phases are also reported. Non-isothermal hydrodesulfurization of model organic sulfur compounds was carried out in a cola-like environment. The model sulfur compounds represented different types of carbon-sulfur bonds commonly encountered in coal. Similar experiments were carried out in the presence of troilite (iron sulfide) to investigate the possibility of sulfur migration from the organic compound to the iron sulfide. Next, iron pyrite was hydrodesulfurized in the presence of some organic molecules to see if sulfur could be incorporated into the organic molecules during the process. Results show that sulfur from organic compounds can be absorbed by troilite, and, similarly, sulfur from pyrite can form new carbon-sulfur bonds during hydrodesulfurization. Based on these observations, it is suggested that during coal conversion reactions it is possible to have intermigration of sulfur between the organic and the inorganic phases.

32464 **(NERDDP-EG—84/358) Determination of trace elements in coal and coal products - part 4: methods for the determination of fluorine, boron, beryllium and lithium in coal and coal products.** Mills, J.C.; Doolan, K.J.; Knott, A.C. (Department of Resources and Energy, Canberra (Australia)). Jul 1983. 86p. Department of Resources and Energy, GPO Box 858, Canberra, ACT 2601, Australia.

A simple, rapid and precise method for fluorine determination has been developed where pyrohydrolysis of the coal sample with oxygen and steam in a conventional tube furnace and absorption in alkaline solution are followed by measurements of fluorine with an ion selective electrode. Boron, beryllium and lithium were determined simultaneously by high voltage spark optical emission spectrometry (OES), however, this was not accurate for 1500 C ash samples generated in the volatility study (part 6) due to mineralogical effects, and a further method based on ash dissolution and measurement using inductively coupled plasma OES has been developed. An alternative procedure for beryllium determination is outlined using acid dissolution of ash and atomic absorption spectrophotometric measurement. 2 refs.

0108 Waste Management

REFER ALSO TO CITATION(S) 32458, 32701

32465 **(DOE/PC/91272—T2) Microbial removal of organic sulfur from coal (bacterial degradation of sulfur-containing heterocyclic compounds): Final report, March 1, 1986-February 28, 1987.** Klubek, B.; Clark, D. (Southern Illinois Univ., Carbondale (USA). Coal Extraction and Utilization Research Center). May 1987. Contract FC22-86PC91272. 32p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87009878.

The presence of substantial levels of sulfur in coal is a major source of air pollution, and considerable efforts are being made to devise an inexpensive way of removing the sulfur. One promising method is microbial desulfurization. Almost all of the inorganic sulfur can be removed from coal by the bacteria Thiobacillus or Sulfolobus, which convert sulfide to sulfate but leave the organic sulfur untouched. Certain coals, including those in the Illinois Basin, contain high levels of organic sulfur, especially thiophenes; hence, removal of organic sulfur is also necessary. If strains of bacteria are developed which remove organic sulfur from coal and are used in conjunction with inorganic sulfur-oxidizing bacteria, the result should be an effective desulfurization method. We are using two approaches to develop bacteria which remove organic sulfur. One method is to mutate Escherichia coli, an organism which is genetically well-understood. Thiophene degraders have been isolated from E. coli and genetically analyzed. Mutations in three novel genes, thdA (12 min), thdC (92 min), and thdD (98 min) were required for thiophene degradation. Constitutive mutations at the previously characterized fadR and atoC loci were also required. The second approach is the isolation of naturally occurring bacteria capable of thiophene degradation by enrichment culture techniques. The degradation rates of thiophene model compounds indicate the potential for desulfurization. Ultimately, the best characteristics of the natural isolates will be cloned into the thiophene-degrading E. coli to yield an improved organic sulfur degrader.

32466 **(NZERDC-P—106) Evaluation of bag filter fabrics for emission control with P.F. [pulverized fuel] fired boilers.** Milne, W. (New Zealand Energy Research and Development Committee, Auckland). Jul 1986. 38p. NTIS (US Sales Only), PC A03/MF A01. File Number DE87900748.

Industry has been encouraged by the Coal Research Association of New Zealand (Inc.) to burn pulverised coal, and there are about 15 p.f. fired shell boilers currently in service. To control air pollution 4 of these boilers have wet scrubbers, 9 have cyclones or multicyclones, and 2 have bag filters, but none of those systems has been completely satisfactory. Five fabric filters were evaluated to improve industry options. Conclusions are positive.

0109 Environmental Aspects

32467 **(DOE/MC/22012—2310) Technical and economic assessment of particle control technology for direct coal fueled turbines: Final report.** DiBella, C.A.W.; Thomas, R.L.; Rubow, L.N.; Zaharchuk, R. (KOH Systems, Inc., Rockville, MD (USA)). Feb 1987. Contract AC21-85MC22012. 111p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE87001087.

Gilbert/Commomwealth (1984) analyzed ten different concepts for high-temperature, high-pressure control of gas stream particulate matter in coal-fueled pressurized fluidized-bed combustion (PFBC) systems. This paper analyzes the five higher ranking concepts of the Gilbert study at direct coal fueled turbine conditions which are even more severe than PFBC conditions. The five concepts are ceramic crossflow filter, ceramic bag filter, granular bed filter, and advanced cyclones. Five ranking factors were used: economic, design, operations complexity, materials/mechanical, and development status. (DLC)

0110 Reserves And Exploration

REFER ALSO TO CITATION(S) 33994

32468 (DOE/ET/14693—T13) Peat deposits of North Carolina: Bulletin 88. Ingram, R.L. (North Carolina Univ., Chapel Hill (USA). Dept. of Geology). 1987. Contract AC18-79ET14693. 93p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE87010859.

Fuel-grade peat is an accumulation of partially decomposed plant material that has less than 25% non-combustible material (ash). In eastern North Carolina peat has formed in the past 10,000 years in swamps or pocosins (coastal swamps), Carolina bays, and river floodplains. Most of the peat is found at the surface with no over-burden and usually ranges in thickness from 1 to 15 ft with an average of 4-1/2 ft. The mean ash content of the fuel-grade peats is about 7.4%, but ash contents of less than 5% are common in most peat deposits. Heating values average 10,100 Btu/lb on a moisture-free basis. Fuel-grade peat deposits cover about 677,000 acres (1060 sq mi) in coastal North Carolina with total resources of about 500 million tons of moisture-free peat. Of this total, about 284,000 acres (444 sq mi) with 319 million tons are underlain by peat greater than 4 ft thick. Peat resources are concentrated in the pocosins or coastal swamps of northeastern North Carolina with the Albemarle-Pamlico peninsula having 55% of the resources and the Dismal Swamp, 11%. The remaining coastal swamp deposits are small but significant. Although 96 Carolina bays have peat, only 46 have peat greater than 4 ft thick; and only one has more than 1 million tons of peat. None of the river floodplain peats located were very large, continuous, or of high quality. 75 refs.

0120 Mining

32469 (MandET/MRL—86-104(TR)) Comparison of dust sampling instruments in coal and uranium ore dust clouds in a dust chamber. Grenier, M.G.; Hardcastle, S.; Frattini, A.; Butler, K. (Department of Energy, Mines and Resources, Elliot Lake, Ontario (Canada). Elliot Lake Lab.). May 1986. 17p. Canada Centre for Mineral and Energy Technology, Ottawa, Ontario.

Tests were conducted on a variety of gravimetric respirable dust samplers to compare their use under varying conditions including dust type, size distribution and concentration. The Casella 10 mm metal cyclone (model T13040), the NCB-MRE 113A horizontal elutriator, and the CAMPEDS personal dust sampler, were compared with the Casella Hexhlett (model 13100). The instruments were tested in various concentrations of pulverized coal and uranium ore dust clouds, in a laboratory dust chamber. Formulae for corrective measurements in lower dust concentrations are presented. 5 refs.

32470 (NZERDC-P—98) Geotechnical factors affecting stability of pit slopes in tertiary sediments, Northern Waikato Coal Region. (Worley Consultants Ltd., Auckland (New Zealand); New Zealand Energy Research and Development Committee, Auckland). Mar 1986. 40p. NTIS (US Sales Only), PC A03/MF A01. File Number DE87900745.

Opencast mining in the northern Waikato Coal Region commonly involves excavation of Tertiary sediments, especially the Te Kuiti Group, of which the coal is a part. In some existing mines, operations have been adversely affected to varying degrees by instability of pit slopes in these sediments. The few available studies of instability have not conclusively identified the factors involved. In 1982, N.Z. Energy Research and Development Committee (NZERDC) Contract No. 3249 was let to Worley Consultants Ltd., to undertake further study. The work was directed towards identifying the main geotechnical factors affecting slope stability. It was intended to provide a basis for more objective geotechnical investigations for future development of deeper opencast mines. Geotechnical factors here include both "geological factors," such as lithology, structure, defects and weathering, and "geomechanical factors" which refer mainly to those parameters amenable to direct measurement, such as classification, index, or strength properties. It is relevant to distinguish between "major" and "minor" instability of pit slopes in relation to coal production. Major instability may be defined as failures of sufficient magnitude to halt or seriously disrupt coal production. Such failures may involve a considerable height of the face being worked and extend laterally for 100 m or more. Minor instability involves failure of individual batters and does not extend laterally for any significant distance. These failures do not seriously affect coal minning operations and are mainly local nuisances. They can be usually attended to by loaders and trucks during normal mining operations. The investigations which form the basis of this report were completed by mid-1983. 22 refs., 14 figs.

0140 Combustion

REFER ALSO TO CITATION(S) 32467

32471 (ANL—86-42) An assessment of the performance of heat exchanger materials in fluidizd-bed combustors. Natesan, K.; Miller, S.A.; Podolski, W.F. (Argonne National Lab., IL (USA)). Feb 1987. Contract W-31109-ENG-38. 141p. NTIS, PC A07/MF A01; 1; GPO Dep. File Number DE87010727.

Atmospheric fluidized-bed-combustion air heaters have been confirmed as an attractive energy-conversion core of future coal-fired electrical power plants. There is still a need, however, for a satisfactory data bank referencing the corrosion/erosion resistance and heat-transfer performance of materials from which in-bed tube banks may be fabricated. This need is addressed. Part of this project, assigned to Argonne, is the collection, review, and interpretation of all of the published data on the corrosion/erosion performance of candidates for heat-exchanger materials of construction when immersed in fluidized beds representative of those foreseen for full-scale air heaters in power plants. This report is the account of that effort. Corrosion data produced over a period of 17 years by 13 organizations are tabulated and analyzed. The data selected are quantitative wastage measurements for alloys or coating/cladding combinations of alloys immersed in fluidized coal-combusting beds at temperatures in the range 554 to 900°C (1029 to 1652°F) for exposures of various durations (few shorter than 250 h) up to 10,000 h. Emphasis is on tests of 500 h or longer at temperatures no lower than 650°C (~1200°F). The resulting correlations of rate of corrosion provide ad hoc guidelines to designers of fluidized-bed air heaters. After a review of hypotheses about the mechanisms of corrosion/erosion phenomena and experiments contributing to an understanding of these mechanisms, a reasonable interpretation is offered. It is concluded that longer tests, additional analytical and modeling efforts, and more-sophisticated small-scale simulations are needed. 80 refs., 50 figs., 47 tabs.

32472 (DOE/METC—86/0235) Pressurized fluidized-bed combustion: Technology status report. (USDOE Morgantown Energy Technology Center, WV). Oct 1984. 46p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE86006599.

DOE has formulated an active research, development, and pilot program for PFBC. The program is designed to develop the technology and data base necessary for successful commercialization of the PFBC concept. The DOE program strategy is based on an orderly progression of exploratory research, process development, and engineering development phases. One aspect of the PFBC program strategy is to encourage private-sector participation in the R & D process, with DOE assuming more risk in the early stages of development. Current DOE activity in the pressurized boiler (steam-cycle) regime centers on participation in the IEA-Grimethorpe pilot plant project in England. Construction and commissioning of the pilot plant is complete, and the first series of testing was completed in December 1981. Performance testing on US coals and UK coals continues. The current status of PFB technology may be summarized as follows: Turbine erosion tolerance and hot-gas cleanup are still barriers; promising turbine corrosion-resistant materials have been identified; first-generation PFBC technology development is maturing at the PDU level, and a comprehensive data base for private-sector reference concerning application of the technology is becoming available; and in-bed heat exchanger materials have been identified, but further long-term exposure data are

required. The DOE PFBC R & D programs are directed at the resolution of these key technical issues. 56 refs., 10 figs., 8 tabs.

32473 **(NZERDC-P—105) Intermittently-fluidised grate: Final report.** Toynbee, P.A. (Coal Research Association of New Zealand, Wellington; New Zealand Energy Research and Development Committee, Auckland). May 1986. 17p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87900749.

The concept of the intermittently-fluidized grate, where burning sub-bituminous coal fines are moved along a slightly-inclined grate by intermittent bursts of increased primary air which cause transient fluidization of the fuel bed, has been investigated. Initial studies with -3 mm sub-bituminous coal in a cold model, provided design data for a small grate (originally 250 x 375 mm), installed in a small Shell boiler (100 kW) with a relatively-large furnace tube. In the first tests with this grate under combustion conditions, the bed of -3 mm coal could not be maintained in the necessary "quiescent" state at the designed flow of primary air. Further, clinkering of the ash quickly solidified the fuel bed, and the combustion process could not continue. Extensive modifications were made following these initial tests. With the placing of firebrick linings along the sides of the grate (also reducing the effective width of the grate), modifications to the coal-feeding system, the addition of firebrick pieces to provide the basis of the fuel-bed, and the recirculation of flue gas, the IF grate operated in the manner originally envisaged. It proved to be most stable in its operation, and its performance was not sensitive to considerable variation in the operating conditions. The system showed itself well suited to on-off operation and hence to automatic control of the combustion system. The intermittently-fluidized grate concept obviously has considerable promise, but the justification for further research effort, would depend on the involvement of an interested equipment manufacturer, and on the willingness of a coal producer to supply surface-dry fines.

32474 **State of Illinois initiatives to develop fluidized bed boiler technology.** Moreland, T.E. (Coal Development Programs, Illinois Dept. of Energy and Natural Resources). pp vp. of Proceedings of the first annual fluidized bed conference. Burke, VA; Council of Industrial Boiler Owners (1985). (CONF-851282—).

From 1. annual fluidized bed conference; Washington, DC, USA (3 Dec 1985).

While gas and oil prices have never reached the point that we thought they might five years ago, Illinois coal is, and we expect it to remain, the economical fuel of choice for our state's industries. The author identified over 1000 gas- or oil-fired industrial boilers in Illinois. If 25% of these boilers converted to coal use, coal sales in our state could increase by 15%, and an additional $1.8 billion dollars in direct and indirect economic activity would be generated in Illinois. Fuel cost savings to industry could total $400 million annually, using recent estimates. This is the kind of new market that technology can open up to our coal industry, and the economic benefits that our state can realize.

0150 Marketing And Economics

REFER ALSO TO CITATION(S) 32474, 32606

32475 **(DOE/EIA—0333(87)) Annual Outlook for US Coal 1987.** (USDOE Energy Information Administration, Washington, DC. Office of Coal, Nuclear, Electric and Alternate Fuels). 1987. 39p. NTIS, PC A03/MF A01 - GPO; 1; GPO Dep. File Number DE87010488.

This report presents, in detail, the long-range forecast for US coal supply and demand through the year 2000 prepared by the Energy Information Administration (EIA). This forecast is an integral part of the overall energy projections summarized in the recently published Annual Energy Outlook 1986. US coal consumption is projected to grow by 2.0% per year between 1985 and 2000. Coal prices are projected to show a very moderate increase of about 1% per year between now and the year 2000. US coal consumption is projected to rise to 888 million tons in 1990, 1021 million tons in 1995, and 1105 million tons in 2000, up from 818 million tons in 1985. The projected growth in coal consumption and hence coal production, is due primarily to the expectation of continued growth in coal demand by electric utilities, the predominant users of coal, and secondarily to increased use of industrial steam coal. US coal exports are projected to rise slowly over the next 15 years, reaching 114 million tons in the year 2000, up from 92 million tons in 1985. In response to increased demand, US coal production is projected to rise from 884 million tons in 1985 to 1217 million tons by the year 2000. No supply bottlenecks are expected, since US coal resources are plentiful and considerable surplus coal production capacity currently exists.

32476 **(EPRI-P—5260) Historical price premiums for low-sulfur coal in the east: Final report.** Price, J.P.; Bissell, P.E. (Resource Dynamics Corp., Vienna, VA (USA); Electric Power Research Inst., Palo Alto, CA (USA)). May 1987. 98p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920435.

Between 1973 and 1984, utility consumption of low-sulfur coal east of the Mississippi River nearly tripled, from 48 to 125 million tons. This increase was driven largely by environmental regulation of both new and existing generating units. Rapid increases in demand created premiums for low-sulfur coal. Historical patterns of these price premiums in the eastern United States are described and implications for the future are drawn. Seven distinct eastern markets for low-sulfur coal have emerged. Prices and premiums differ among these markets. Within each market, however, consumers options are generally similar and the same factors affect premiums. Important distinctions are drawn between structural and temporal premiums. Structural premiums are permanent and are caused by cost differences within the coal industry. Temporal premiums, in contrast, are caused by unplanned-for events and last until competition among producers forces them down.

02 PETROLEUM

0202 Geology And Exploration

REFER ALSO TO CITATION(S) 33987, 33993

0203 Drilling And Production

32477 **(AEEW-M—2317) Model surfactant studies II: Effect of alcohol partitioning on phase behaviour experiments.** Lee-Tuffnell, C.D. (UKAEA Atomic Energy Establishment, Winfrith; Department of Energy, London (UK)). Jul 1986. 25p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87752453.

Phase behaviour investigations on the single surfactant model system have been used to identify suitable phase component compositions and salinity levels upon which a quaternary phase diagram will be developed. Alcohol partitioning has been investigated and was found to correlate with deviations from the expected optimal salinity values.

32478 **(AEEW-M—2335) Model surfactant studies III: Use of the Lever Rule in the optimal pseudo-ternary phase diagram.** Lee-Tuffnell, C.D. (UKAEA Atomic Energy Establishment, Winfrith; Department of Energy, London (UK)). Jul 1986. 23p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87752454.

The Lever Rule (volume balance) has been used to predict the positions of the II^+ and III phase boundary lines for the optimal pseudo-ternary phase diagram of the single surfactant model system. Experimental analysis of the phases has demonstrated that the Lever Rule accurately predicts the phase compositions on the optimal phase diagram. All phase compositions were found to lie on, or very close to, the plane of the optimal pseudo-ternary phase diagram.

32479 (AEEW-M—2353) Model surfactant studies IV: Summary of first year's progress on phase behaviour 1985-1986. Lee-Tuffnell, C.D.; Foulser, R.W.S. (UKAEA Atomic Energy Establishment, Winfrith; Department of Energy, London (UK)). Sep 1986. 29p. NTIS (US Sales Only), PC A03/MF A01. File Number DE87752455.

The phase behaviour of the single surfactant model system has been investigated during the last year. This memorandum provides a summary of the procedures that were required before the data could begin to be used to model, experimentally and theoretically, phase behaviour in porous media.

32480 (DOE/BC—86/7/SP) Supporting technology for enhanced oil recovery: In-situ combustion predictive model. Ray, R.M.; Munoz, J.D. (USDOE Bartlesville Project Office, OK; INTEVEP, Filial de Petroleos de Venezuela, SA, Caracas). Dec 1986. 264p. NTIS, PC A12/MF A01; 1; GPO Dep. File Number DE86000284.

The In-Situ Combustion Predictive Model (ICPM) was developed by Scientific Software-Intercomp for the National Petroleum Council (NPC) for its 1984 survey of US enhanced oil recovery potential (NPC, 1984). The architecture of the ICPM is similar to that of the other predictive models in the series (Paul et al., 1982; Aydelotte and Pope, 1983; Paul et al., 1984): an oil rate versus time function for a single pattern is computed, the results of which are passed to the economic calculations. Data for process costs, reservoir development costs, and operating costs, and a pattern schedule if multiple patterns are desired, allow the computation of discounted cash flow and other measures of profitability. A brief summary of the oil recovery and economic calculations for the ICPM is given in Sections 1.2 and 1.3. 12 refs., 15 figs., 24 tabs.

32481 (DOE/BC—86/10/SP) Supporting technology for enhanced oil recovery: Polymer predictive model. (USDOE Bartlesville Project Office, OK; INTEVEP, Filial de Petroleos de Venezuela, SA, Caracas). Dec 1986. 386p. NTIS, PC A17/MF A01; 1; GPO Dep. File Number DE87001207.

The Polymer Flood Predictive Model (PFPM) was developed by Scientific Software-Intercomp for the National Petroleum Council's (NPC) 1984 survey of US enhanced oil recovery potential (NPC, 1984). The PFPM is switch-selectable for either polymer or waterflooding, and an option in the model allows the calculation of the incremental oil recovery and economics of polymer relative to waterflooding. The architecture of the PFPM is similar to that of the other predictive models in the series: in-situ combustion, steam drive (Aydelotte and Pope, 1983), chemical flooding (Paul et al., 1982) and CO_2 miscible flooding (Paul et al., 1984). In the PFPM, an oil rate versus time function for a single pattern is computed and then is passed to the economic calculations. Data for reservoir and process development, operating costs, and a pattern schedule (if multiple patterns are desired) allow the computation of discounted cash flow and other measures of profitability. The PFPM is a three-dimensional (stratified, five-spot), two-phase (water and oil) model which computes water from breakthrough and oil recovery using fractional flow theory, and models areal and vertical sweeps using a streamtube approach. A correlation based on numerical simulation results is used to model the polymer slug size effect. The physical properties of polymer fluids, such as adsorption, permeability reduction, and non-Newtonian effects, are included in the model. Pressure drop between the injector and producer is kept constant, and the injectivity at each time step is calculated based on the mobility in each streamtube. Heterogeneity is accounted for by either entering detailed layer data or using the Dykstra-Parsons coefficient for a reservoir with a log-normal permeability distribution. 24 refs., 27 figs., 59 tabs.

32482 (DOE/BC—86/11/SP) Supporting technology for enhanced oil recovery: Chemical flood predictive model. Ray, R.M.; Munoz, J.D. (USDOE Bartlesville Project Office, OK; INTEVEP, Filial de Petroleos de Venezuela, SA, Caracas). Dec 1986. 362p. NTIS, PC A16/MF A01; 1; GPO Dep. File Number DE87001208.

The Chemical Flood Predictive Model (CFPM) was developed by Scientific Software-Intercomp for the US Department of Energy and was used in the National Petroleum Council's (NPC) 1984 survey of US enhanced oil recovery potential (NPC, 1984). The CFPM models micellar (surfactant)-polymer (MP) floods in reservoirs which have been previously waterflooded to residual oil saturation. Thus, only true tertiary floods are considered. An option is available in the model which allows a rough estimate of oil recovery by caustic (alkaline) or caustic-polymer processes. This "caustic" option, added for the NPC survey, is not modeled as a separate process. Rather, the caustic and caustic-polymer oil recoveries are computed simply as 15% and 40%, respectively, of the MP oil recovery. In the CFPM, an oil rate versus time function for a single pattern is computed and the results are passed to the economic routines. To estimate multi-pattern project behavior, a pattern development schedule must be specified. After-tax cash flow is computed by combining revenues with capital costs for drilling, conversion and upgrading of wells, chemical handling costs, fixed and variable operating costs, injectant costs, depreciation, royalties, severance, state, federal, and windfall profit taxes, cost and price inflation rates, and the discount rate. A lumped parameter uncertainty routine is used to estimate risk, and allows for variation in computed project performance within an 80% confidence interval. The CFPM uses theory and the results of numerical simulation to predict MP oil recovery in five-spot patterns. Oil-bank and surfactant breakthrough and project life are determined from fractional flow theory. A Koval-type factor, based on the Dykstra-Parsons (1950) coefficient, is used to account for the effects of reservoir heterogeneity on surfactant and oil bank velocities. 18 refs., 17 figs., 27 tabs.

32483 (DOE/BC—86/12/SP) Supporting technology for enhanced oil recovery: CO_2 miscible flood predictive model. Ray, R.M.; Munoz, J.D. (INTEVEP, Filial de Petroleos de Venezuela, SA, Caracas; USDOE Bartlesville Project Office, OK). Dec 1986. 470p. NTIS, PC A20/MF A01; 1; GPO Dep. File Number DE87001209.

The CO_2 Miscible Flood Predictive Model (CO2PM) was developed by Scientific Software-Intercomp for the US Department of Energy and was used in the National Petroleum Council's (NPC) 1984 survey of US enhanced oil recovery potential (NPC, 1984). The CO2PM is applicable to both secondary (mobile oil) and tertiary (residual oil) floods, and to either continuous CO_2 injection or water-alternating-gas (WAG) processes. In the CO2PM, an oil rate versus time function for a single pattern is computed, the results of which are passed to the economic calculations. To estimate multi-pattern project behavior a pattern development schedule is required. After-tax cash flow is computed by combining revenues with costs for drilling, conversion and well workovers, CO_2 compression and recycle, fixed and variable operating costs, water treating and disposal costs, depreciation, royalties, severance, state, federal and windfall profit taxes, cost and price inflation rates, and the discount rate. A lumped parameter uncertainty model is used to estimate risk, allowing for variation in computed project performance within an 80% confidence interval. The CO2PM is a three-dimensional (layered, five-spot), two-phase (aqueous and oleic), three component (oil, water, and CO_2) model. It computes oil and CO_2 breakthrough and recovery from fractional theory modified for the effects of viscous fingering, areal sweep, vertical heterogeneity and gravity segregation. 23 refs., 19 figs., 57 tabs.

32484 (DOE/METC—87/0253) Gas miscible displacement enhanced oil recovery: Technology status report. (USDOE Morgantown Energy Technology Center, WV). Oct 1986. 42p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87001049.

Gas miscible displacement enhanced oil recovery research is conducted by the US Department of Energy's Morgantown Energy Technology Center to advance the application of miscible carbon dioxide flooding. This research is an integral part of a multidisciplinary effort to improve the technology for producing additional oil from US resources. This report summarizes the problems of the technology and the 1986 results of the ongoing research that was conducted to solve those problems. Poor reservoir volumetric sweep efficiency is the major problem associated with gas flooding and all miscible displacements. This problem results from the channeling and viscous fingering that occur due to the large differences between viscosity or density of the displacing and displaced fluids (i.e., carbon dioxide and oil, respectively). Simple modeling and core flooding studies indicate that, because of differences in fluid viscosities, breakthrough can occur after only 30% of the total pore

volume (PV) of the rock has been injected with gas, while field tests have shown breakthrough occurring much earlier. The differences in fluid densities lead to gravity segregation. The lower density carbon dioxide tends to override the residual fluids in the reservoir. This process would be considerably more efficient if a larger area of the reservoir could be contacted by the gas. Current research has focused on the mobility control, computer simulation, and reservoir heterogeneity studies. Three mobility control methods have been investigated: (1) the use of polymers for direct thickening of high-density carbon dioxide, (2) mobile "foam-like dispersions" of carbon dioxide and an aqueous surfactant, and (3) in situ deposition of chemical precipitates. 22 refs., 14 figs., 6 tabs.

32485 **(NMRDI—2-74-4324) Rock matrix and fracture analysis of flow in Western tight gas sands: 1986 annual report: Phase 2.** Morrow, N.R.; Buckley, J.S.; Cather, S.M.; Brower, K.R. (New Mexico Inst. of Mining and Technology, Socorro (USA). New Mexico Petroleum Recovery Research Center). Apr 1987. 52p. NTIS, PC A04/MF A01 - NMERDI-Univ. of New Mexico, 457 Washington S.E., Albuquerque, NM 87108. File Number DE87900773.

The objective of this project is to develop reliable core analysis techniques for tight sands; these are essential to proper formation evaluation. Comparison of thin section porosity to pore volume has been used to develop a measure of quality of pore space. Natural fractures play a dominant role in production from tight sands. All available thin sections (about 600 in all) and MWX core on hand have been screened for the presence of natural fractures. Relative permeabilities to gas along healed (calcite-filled) fractures have been determined. Results show that the calcite filled fractures heal to where they have roughly the same permeability as the matrix, although some differences in the pressure sensitivity of the fracture and the matrix were observed. Permeabilities for fresh cores (not allowed to dry out) have been compared with results for conventional (dried) cores to determine what changes result from drying. Results obtained to date show that drying can affect the permeability and relative permeabilities of tight gas sands but the effect is not serious. UV microscopy is being employed to examine much finer features of pore structure (of the order of a few tenths microns) than is possible by conventional petrographic microscopy. Comparison of pore structure of a low permeability gas sand at ambient pressure with that at 5000 psi confining pressure supports a previous conclusion that sheet pores at grain boundaries tend to close up with increase in overburden pressure. 10 refs., 18 figs., 4 tabs.

32486 **Downhole steam quality measurement.** Lee, D.O.; Montoya, P.C.; Muir, J.F.; Wayland, J.R. (to Dept. of Energy, Washington, DC). US Patent 4,658,208. 14 Apr 1987. Filed date 19 Jun 1985. vp.

A method is described for measuring the quality of steam flowing through a conduit containing a pair of spaced electrodes comprising calibrating the system by: filling the conduit with steam samples of known qualities; applying an AC frequency across the electrodes; measuring the capacitance between the electrodes as a function of frequency for each steam sample; determining a frequency range where measured capacitance is a linear function of steam quality; and injecting an unknown sample of steam into the conduit; applying an alternating voltage at a selected frequency within the frequency range to the electrodes; measuring the capacitance between the electrodes at the selected frequency; and determining steam quality from the capacitance measurement.

32487 **The effects of size, shape, and orientation of an impermeable region on transient pressure testing.** Britto, P.; Sageev, A. (Stanford Univ.). pp 487-498 of Proceedings of the 57th annual California regional meeting of the SPE. Richardson, TX; Society of Petroleum Engineers (1987). (CONF-870496—).

From 57. annual Society of Petroleum Engineers California regional meeting; Ventura, CA, USA (8 Apr 1987).

A practical consideration of the effects of the shape, size, and orientation of an impermeable reservoir region on transient pressure testing is presented. The constant rate production well is external to the impermeable region. Impermeable regions may be in the form of sealing fractures of finite length, that have little volume associated with them and are only a local restriction to fluid flow. These regions may also be shale lenses or reduced permeability regions that in addition to being a restriction to flow occupy a significant reservoir volume. This paper considers a single impermeable region with various sizes, shapes, and orientation with respect to the active source well. The transient pressure response of the constant rate well is generated by replacing the impermeable boundaries by a set of line sources, and then applying the method of superposition. This method can be extended to include pressure responses of interference wells. The method is validated by matching the pressure responses of simple cases like a linear no-flow boundary and an internal circular no-flow boundary.

32488 **An experimental investigation of gas-bubble breakup in constricted square capillaries.** Gauglitz, P.A.; St. Laurent, C.M.; Radke, C.J. (Univ. of California). pp 451-462 of Proceedings of the 57th annual California regional meeting of the SPE. Richardson, TX; Society of Petroleum Engineers (1987). (CONF-870496—).

From 57. annual Society of Petroleum Engineers California regional meeting; Ventura, CA, USA (8 Apr 1987).

Recent advances in enhanced oil recovery involve generating foam within underground porous media to displace the oil. The authors investigate experimentally the important snap-off mechanism of gas-bubble generation in constricted square capillaries. Sixteen mm movies record the snap-off of smaller bubbles from a larger bubble as it moves through the constriction. The time required for bubbles to snap off once they move past the constriction, and the length of the generated bubbles are obtained from viewing the movie frames. Results show that a dimensionless time to snap-off depends weakly on the capillary number, and that the generated bubble size increases almost linearly with increasing capillary number. Surfactants create dynamically immobile interfaces for surfactant solutions of 1 wt% sodium dodecyl benzene sulfonate (SDBS) and Chevro Chaser SD1000.

32489 **Frontal advance theory for flow in heterogeneous porous media.** Pande, K.K.; Ramey, H.J. Jr.; Brigham, W.E.; Orr, F.M. Jr. (Stanford Univ.). pp 215-226 of Proceedings of the 57th annual California regional meeting of the SPE. Richardson, TX; Society of Petroleum Engineers (1987). (CONF-870496—).

From 57. annual Society of Petroleum Engineers California regional meeting; Ventura, CA, USA (8 Apr 1987).

This paper concerns the application of frontal advance theory to displacement processes in heterogeneous porous media. The assumptions under which a generalized frontal advance equation can be used to describe a flow process in a heterogeneous porous medium are examined. Material balance equations are derived based on these assumptions, and the theory is illustrated by application to the Dykstra-Parsons model of flow in noncommunicating layers. The authors show that the resulting formulation can be used to forecast performance and to solve the inverse problem: the determination of a permeability distribution from displacement data. This approach can also be used to determine pseudorelative permeability curves appropriate to a one-dimensional description of a layered system. They also consider the use of pseudorelative permeabilities in simulation studies to represent the effects of reservoir heterogeneities with length scales smaller than a grid block. The dependence of process performance and pseudorelative permeabilities on scale is described.

32490 **Foam production during steam displacement of aqueous surfactants.** Michaels, K.F.; Udell, K.S. (Lawrence Berkeley Lab.). pp 97-104 of Proceedings of the 57th annual California regional meeting of the SPE. Richardson, TX; Society of Petroleum Engineers (1987). (CONF-870496—). Contract AC03-76SF00098.

From 57. annual Society of Petroleum Engineers California regional meeting; Ventura, CA, USA (8 Apr 1987).

The formation and flow of foam in porous media under conditions characteristic of steam injection were examined through a series of one-dimensional displacement experiments. It was observed that the steam front propagation velocity and temperature field ahead of and behind the condensation front were not significantly different for steam injection into partially saturated or dry

media as compared to a water saturated medium. Significant differences in measured parameters were observed during steam displacement of a 1% by weight surfactant solution. The steam phase mobility decreased upstream of the condensation front by factors of 4.3 and 7.6 under conditions where noncondensable gases were not present and present as an initial gas saturation, respectively.

32491 **Mechanisms of residual oil displacement by steam injection.** Stewart, L.D.; Udell, K.S. (Univ. of California). pp 85-96 of Proceedings of the 57th annual California regional meeting of the SPE. Richardson, TX; Society of Petroleum Engineers (1987). (CONF-870496—).

From 57. annual Society of Petroleum Engineers California regional meeting; Ventura, CA, USA (8 Apr 1987).

A model of one-dimensional steam displacement of residual oil has been developed. The quasi-steady model considers the capillary pressure gradients due to the simultaneous flow of the oil, water, and steam to be the dominant factors in oil bank mobilization. The effects of gravity on steam displacement were also included in the model. Semi-analytical calculations of saturation and pressure distributions are presented to illustrate the mechanisms. It was shown that under most conditions, the Buckley-Leverett displacement velocity is significantly faster than the steam condensation front velocity. This result and conservation of oil mass required the use of the steam condensation front velocity as the characteristic velocity in the problem formulation. An expression for a limiting oil saturation at the steam zone interface was thus derived.

0207 Marketing And Economics

REFER ALSO TO CITATION(S) 33020

32492 **(DOE/EI/19924—T1) Distillate fuel oil survey: Final report, 1986-1987.** (New Hampshire Governor's Energy Office, Concord (USA)). 1987. Contract FC01-86EI19924. 35p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87009959.

In the 1986-1987 heating season, the New Hampshire Governor's Energy Office continued the fuel price survey program first begun in 1976. As in the previous two years, data was collected with the assistance of a small grant from the US Department of Energy, Energy Information Agency. The data was shared with that agency which, at the request of the US Congress continues to monitor the price and supply of home heating oil. The effort is concentrated in areas such as New England which are heavily dependent on oil to meet winter heating needs.

32493 **(DOE/EIA—0380(87/02)) Petroleum marketing monthly, February 1987.** (USDOE Energy Information Administration, Washington, DC. Office of Oil and Gas). 29 Apr 1987. 155p. NTIS, PC A08/MF A01 - GPO; 1; GPO Dep. File Number DE87009698.

Information and statistical data are given for a variety of crude oils and refined petroleum products. The publication provides crude oil cost statistics and refined petroleum products sales statistics for use by industry, government, private sector analysts, educational institutions, and consumers. Data on crude oil include the domestic first purchase price, the f.o.b. and landed cost of imported crude oil, and the refiners' acquisition cost of crude oil. Sales data for motor gasoline, distillates, residuals, aviation fuels, kerosene, and propane are presented.

32494 **(DOE/EIA—0380(87/03)) Petroleum Marketing Monthly, March 1987.** (USDOE Energy Information Administration, Washington, DC. Office of Oil and Gas). 2 Jun 1987. 153p. NTIS, PC A08/MF A01 - GPO; GPO Dep. File Number DE87010482.

Information and statistical data are given about a variety of crude oils and refined petroleum products. The publication provides crude oil cost statistics and refined petroleum products sales statistics for use by industry, government, private sector analysts, educational institutions, and consumers. Data on crude oil include the domestic first purchase price, the f.o.b. and landed cost of imported crude oil, and the refiners' acquisition cost of crude oil. Sales data for motor gasoline, distillates, residuals, aviation fuels, kerosene, and propane are presented.

0209 Environmental Aspects

32495 **(PB—87-160057/XAB) Marine environmental assessment: Gulf of Mexico 1985 annual summary.** Pechmann, K.B.; Ellis, J.O.; Everdale, F.G.; Green, S.Z.; Sheifer, I.C. (National Environmental Satellite, Data, and Information Service, Washington, DC (USA). Assessment and Information Services Center). Dec 1986. 122p. NTIS, PC A06/MF A01.

The Gulf of Mexico 1985 Annual Assessment presents a synoptic view of several economic sectors and their direct and indirect relations to the physical and biological aspects of the marine and atmospheric environments. The report is comprised of seven sections. In the introductory section the authors define the concept of an assessment as embodied in the report, specify the coverage of the present report, and suggest areas of extension and future development. In section 2 the authors present a summary of impacts they have identified for 1985. Sections 3 through 6 contain details of the weather and ocean conditions, fisheries, recreation, and transportation in the Gulf of Mexico marine environment for 1985. Section 7 contains a discussion of a selected environmental issue in the Gulf. The disposition of abandoned offshore oil and gas platforms.

32496 **(PB—87-165403/XAB) Exploration, development, and production of crude oil and natural gas. (technical report). Field sampling and analytical results.** Hall, B. (Environmental Protection Agency, Washington, DC (USA). Office of Solid Waste). 31 Jan 1987. 131p. (EPA—530/SW-87/005). NTIS, PC A07/MF A01.

See also Appendix A, PB—87-165411.

The U.S. Environmental Protection Agency (EPA) regulates or makes determinations as to whether to regulate the oil and gas extraction industry under several major environmental statutes. These statutes include the Clean Water Act, the Safe Drinking Water Act, and the Resource Conservation and Recovery Act, which uses information from the study under Section 8002(m). The purpose of this technical report is to present the findings of the field sampling and analysis project conducted on wastes associated with exploration, development, and production activities of crude oil and natural gas. The report presents the analytical methods, role and function of the Sampling Control Center, list of analyses, and the sampling plan and sampling quality assurance quality control plan.

03 NATURAL GAS

32497 (NEI-NO—5, pp 26, Paper 7) **Norwegian natural gas. Reserves, production and markets.** Johnsen, A. (Statoil, Stavanger Norway). 1985. NTIS (US Sales Only), PC A08/MF A01. (CONF-8509392—).

From 3. European gas conference; Oslo, Norway (25 Sep 1985).

So far the main competitive characteristic of natural gas in the Western European market has been the timely, efficient and businesslike development, transportation and distribution of an overwhelmingly indigenous resource. The gas market will continue to grow, and the share of imported gas will increase. Further penetration of gas in the market will depend on gas prices relative to the relevant alternative energies. Based on these assumptions there is likely to be a marked for new Norwegian gas in the 1990s. The potential may increase substantially after year 2000. The Norwegian gas will come from various fields, the Troll field being the most important. The new gas is located predominantly in deep water and in some cases far from the market. The challenging task to produce these reserves will be met by extensive research and development work to find technically and economically feasible solutions. Some of the key areas of development are subsea production systems and multi-phase transportation. 13 figures.

0302 Geology And Exploration

32498 **(DOE/MC/20422—2337) Geologic history and hydrocarbon potential of late cretaceous-age, low-permeability reservoirs, Piceance Basin, western Colorado: Final report.** Johnson, R.C. (Geological Survey, Denver, CO (USA)). Mar 1987. Contract AI21-83MC20422. 102p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE87006476.

The Piceance basin of western Colorado contains large reserves of natural gas in low-permeability reservoirs of the Late Cretaceous-age Mesaverde Formation or Mesaverde Group. The gas accumulation can be divided into three general zones: a zone of surface-water invasion that extends inward a few miles from present outcrops; a gas-and-water-bearing zone that extends 10 to 20 miles inward from the water-bearing zone; and a central, predominantly gas-bearing zone. The Mesaverde low-permeability gas accumulation in the Piceance basin probably formed as a result of early loss of permeability due to intense regional diagenesis, followed by deep burial beneath lower Cenozoic sediments that resulted in large-scale thermal gas generation by the organic-rich intervals in the Mesaverde and in the underlying Mancos Shale. Although the early loss of permeability trapped much of the gas in the deep central areas of the basin, considerable amounts of gas also migrated updip into the shallower areas of the basin where the Mesaverde is thermally immature. This migration may have been enhanced by an extensive natural fracture system. Reconstruction of the geologic history of both the Piceance basin and the surrounding uplifts has helped define conditions under which the gas accumulation formed. This report integrates some of the detailed geologic studies from the Multiwell Experiment and the more regional geologic studies in an effort to improve our understanding of the geologic variables involved in the development of the Mesaverde low-permeability gas accumulation in the Piceance basin. This synthesis relies heavily on published studies, but much new information is also presented. 118 refs., 30 figs., 3 tabs.

0303 Drilling, Production, And Processing

REFER ALSO TO CITATION(S) 32487

0306 Marketing And Economics

32499 **(DOE/EIA—0130(87/03)) Natural Gas Monthly, March 1987.** (USDOE Energy Information Administration, Washington, DC. Office of Oil and Gas). 3 Jun 1987. 157p. NTIS, PC A08/MF A01 - GPO; 1; GPO Dep. File Number DE87010576.

Current data on natural and supplemental gas consumption, disposition, production, prices, storage, imports, and exports in the United States are provided for each year from 1981 through April 1987 with monthly data for the most recent 3 years. Some data are also given by State or city, some data are also given for previous years. Operating and financial data for major interstate natural gas pipeline companies, as well as data on filings, ceiling prices, and transportation under the Natural Gas Policy Act of 1978, are also included. Explanatory notes, a discussion of data sources, and a glossary are included. Three reports previously published as separate annuals are now published in this report. The three are: "Underground Natural Gas Storage in the United States" (DOE/EIA-0239). "US Imports and Exports of Natural Gas" (DOE/EIA-0188), and "Main Line Sales of Natural Gas to Industrial Users" (DOE/EIA-0129). Featured article for this month is "Estimated Distribution of Proved Natural Gas Reserves among the Geologic Provinces of the Lower 48 States." 11 figs., 40 tabs.

32500 **(PB—87-181954/XAB) MicroGas food dryer: technology and market-assessment study. Final report, April-August 1986.** Ushimaru, K.; Kunkle, R.; Bernstein, S. (Energy International, Inc., Bellevue, WA (USA)). Dec 1986. 99p. NTIS, PC A05/MF A01.

The drying of physically delicate products poses unusual technical challenges due to the temperature sensitivity of products. The conventional approach in drying these temperature-sensitive materials has been to employ mild drying conditions, but this prolongs the drying process and requires large, and thus costly, drying hardware. A promising alternative to the conventional drying equipment is the utilization of dielectric energy in the final stages of drying. The microGas dryer has been developed and the system is an integrated, gas-fired thermal system which offers the advantages of dielectric heating together with convective process heat in a single unitary package. The combined benefit of the integrated package would result in the maximum utilization of the gas prime mover and significant savings in operating costs of the equipment.

0308 Environmental Aspects

REFER ALSO TO CITATION(S) 32496

0309 Artificial Stimulation

REFER ALSO TO CITATION(S) 32489

32501 **(PB—87-176319/XAB) Coalbed methane development in Alabama: biological and hydrological conditions of streams draining the Cedar Cove degasification field. Topical report (Final), January 1985-June 1986.** O'Neil, P.E.; Mettee, M.F.; Harris, S.C. (Alabama Geological Survey, University (USA)). Jan 1987. 115p. NTIS, PC A06/MF A01.

The development of methane gas from coal seams is a growing industry in Alabama. Current environmental regulations allow land and stream disposal of the produced waters under National Pollution Discharge Elimination System permitting regulations. Environmental concerns associated with produced waters are the effects of high chloride and iron concentrations on the biology and chemical regime of the receiving stream. The goals of this study were to characterize produced waters and receiving streams and to analyze stream impacts resulting from operation of a coalbed-degasification field. Results of the study indicate that the chemical regime of smaller streams is distinctly changed due to either runoff or discharge of produced waters whereas larger streams greatly modify the effect. In streams where active discharge of produced waters occurred, coal surface-mine runoff had already significantly affected the integrity of biological communities. Our results indicate, however, that the addition of produced waters to the stream created no significant additional degradation to the already stressed biological system.

0340 Combustion

REFER ALSO TO CITATION(S) 33085

04 OIL SHALES AND TAR SANDS

0404 Oil Production, Recovery, And Refining

REFER ALSO TO CITATION(S) 32449

32502 **(DOE/FE/60177—2348) Retorting of nonuniform oil shale rubble.** Sudduth, B.C.; Merriam, N.W.; Turner, T.F.; Vaughn, P.; Cha, C.Y. (Western Research Inst., Laramie, WY (USA)). Apr 1987. Contract FC21-83FE60177. 25p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010656.

Nonuniform oil shale rubble beds were retorted using the 10-ton retort at the Western Research Institute. In a series of 10 tests, two different size distributions of oil shale rubble were loaded into separate portions of the retort cross section. This loading procedure provided permeability ratios in the range of 0.019 to 0.97 between the two shale size distributions, and the fractional cross-sectional area of the smaller region ranged from 0.05 to 0.50 of the total retort cross section. In each retorting test, the gas flow distribution was measured at cold flow conditions, and the nonuniform rubble bed was retorted using direct combustion with air or air-and-steam mixtures. The first nine retorting tests demonstrate that the oil yield from the less permeable region decreases in proportion to the

square root of the permeability ratio between the two shale size distributions. The measured oil yields correspond to the combined predictions of one-dimensional model calculations for each portion of the rubble bed. The dimensionless response times of gas tracers also correlate with the measured oil yields. A higher oil yield and retort sweep efficiency are demonstrated by burning propane at the top of the more permeable region in the tenth nonuniform retorting test. The propane combustion increases the gas pressure drop in the more permeable region, so more of the injected air is distributed to the less permeable region. For a severe permeability ratio of about 0.02, propane combustion improves retorting sweep efficiency from 50% to 80% of the rubble bed and increases oil yield from 16.5% to 32.2% of Fischer assay. The corresponding incremental energy production as oil and gas is 2.4 times greater than the cumulative energy content of the injected propane. 18 refs., 7 figs., 1 tab.

0409 Waste Research And Management

32503 **(DOE/ER/60072—T1) Persistence of biologically active compounds in soil: Final report.** Williams, S.E. (Wyoming Univ., Laramie (USA). Dept. of Plant Science). Feb 1987. Contract AC02-82ER60072. 109p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE87010250.

This document describes the long-term effects of soil-applied oil shale process water on the VA fungi and Rhizobium bacteria in a native soil. Techniques include assessing the VA fungal activity at field treatment plots and using treated field soils in a bioassay to determine VA infection and Rhizobium-nodulation potentials four years after process water application. 52 refs., 32 figs., 2 tabs.

05 NUCLEAR FUELS

0501 Reserves, Exploration, And Mining

REFER ALSO TO CITATION(S) 33995

32504 **(PB—87-164448/XAB) Uranium occurrences in the northern Darby Mountains, Seward Peninsula, Alaska. Information circular.** Foley, J.Y.; Barker, J.C. (Bureau of Mines, Fairbanks, AK (USA). Alaska Field Operations Center). 1986. 35p. (BM-IC—9103). NTIS, PC A03/MF A01.

Library of Congress catalog card no. 86-600189.

In 1980, the Bureau of Mines investigated the northern Darby Mountains on the Seward Peninsula, Alaska, for radioactive mineral deposits. Uranium is concentrated in silicified shear zones in biotite quartz monzonite of the Darby pluton. Similar geochemical and radiometric anomalies over disclosed altered zones and geochemical anomalies in sediments downstream from the altered zones indicate that additional areas may also be favorable targets for uranium deposits. Analyses of panned, heavy-mineral concentrates show no significant concentrations of uranium or thorium in resistant heavy minerals. This indicates that radioactive elements in the Darby pluton are concentrated in soluble, nonresistant minerals that may constitute a recoverable uranium resource.

32505 **(PER—96) Uranium potential of the Bushveld Complex, South Africa. Atomic Energy Corporation of South Africa Limited and University of Pretoria working group for uranium in the Bushveld Complex: progress report No. 2.** Simpson, P.R. (Nuclear Development Corp. of South Africa (Pty.) Ltd., Pelindaba, Pretoria). Apr 1986. 34p. NTIS (US Sales Only), PC A03/MF A01. File Number DE87702403.

This paper presents a summary on much of the existing geochemical data on the siliceous components of the Bushveld Complex (i.e., the felsites, granophyres and granites) with a view to establishing the U potential of the district. Although very few U analyses are actually available, sophisticated normalised data plots are utilized to estimate the probable U contents of the rock types. The members of the siliceous suite exhibit a gradual chemical evolution through time and illustrates that the most evolved members of the suite probably contained the highest primary U contents. It is emphasized that most known Bushveld Sn and F occurrences, with which U is likely to be associated, and most of the recognized radiometric anomalies in the complex, are concentrated along major lineaments. In this respect the Murchison and Franspoort directions are considered to be particularly important. In conclusion the argument follows that the potential for undiscovered hydrothermal U ores in the Bushveld Complex is high, and that five factors will probably control the location of such deposits. These factors include: 1. Sn, F and LIL-enriched source granite; 2. High post-emplacement heat production to promote the development of post-emplacement mineralizing systems; 3. A tectonically unstable source region with major fracture zones; 4. Suitable trap environments in the granites and their country rocks; 5. A source of fluids from aquifers in the granite aureole.

32506 **(PER—97) Evaluation of the uranium potential of the Bushveld Complex. Atomic Energy Corporation of South Africa Limited and University of Pretoria working group for uranium in the Bushveld Complex: progress report No. 1.** Cheney, E.S. (Nuclear Development Corp. of South Africa (Pty.) Ltd., Pelindaba, Pretoria). Apr 1986. 158p. NTIS (US Sales Only), PC A08/MF A01. File Number DE87702404.

The poor quality of the airborne radiometric surveys and the lack of exploration geochemical data in the public domain prevent a satisfactory assessment of the uranium potential of the Bushveld area. Undue reliance must be placed upon fitting models of uranium ore deposits to the geology of the Bushveld area. Although the Bushveld granites have an unusually high background of uranium (20 to 40 ppm), they probably only host small vein-type deposits. The vein at the Albert Silver mine should be investigated as a type example to determine if it is only economic in the narrow interval of supergene enrichment. The Rooiberg Group has considerable potential for caldera-related deposits and for uranium-bearing sulphide deposits (including Olympic Dam-type deposits) in sedimentary interbeds. The Loskop Formation appears to be correlative with the Glentig and lower Swaershoek Formations of the Waterberg area. The Waterberg Group is the logical host to investigate for giant uncomformity/vein-type uranium deposits like those in Canada and Australia. Because the Waterberg consists of four uncomformity-bounded sequences, it is rarely more than 3 km thick; all of the sequences could be younger than 1770 Ma.

0504 Feed Processing

32507 **(DOE/OR/20722—143) Hazelwood Interim Storage Site annual site environmental report: Calendar year 1986.** (Bechtel National, Inc., Oak Ridge, TN (USA)). Jun 1987. Contract AC05-81OR20722. 66p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87010150.

During 1986, the environmental monitoring program was continued at the Hazelwood Interim Storage Site (HISS), a US Department of Energy (DOE) facility located in the City of Hazelwood, Missouri. Originally known as the Cotter Corporation site on Latty Avenue in Hazelwood, the HISS is presently used for the storage of soils contaminated with residual radioactive material. As part of the decontamination research and development project authorized by Congress under the 1984 Energy and Water Appropriations Act, remedial action and environmental monitoring program are being conducted at the site and at vicinity properties by Bechtel National, Inc., Project Management Contractor for FUSRAP. The monitoring program at the HISS measures radon gas concentrations in air; external gamma radiation levels; and uranium, radium, and thorium concentrations in surface water, groundwater, and sediment. To verify that the site is in compliance with the DOE radiation protection standard (100 mrem/yr) and assess its potential effect on public health, the radiation dose was calculated for the maximally exposed individual. Based on the scenario described in this report, the maximally exposed individual at the HISS would receive an annual external exposure approximately equivalent to 2% of the DOE radiation protection standard of 100 mrem/yr. This exposure is less than the exposure a person would receive during a round-trip flight from New York to Los Angeles. The cumulative dose to the population within an 80-km (50-mi) radius of the HISS that would result from radioactive materials present at the site would be indistinguishable from the dose that the same population would receive from naturally occurring radioactive sources. Results

of the 1986 monitoring show that the HISS is in compliance with the DOE radiation protection standard. 11 refs., 6 figs., 10 tabs.

0505 Uranium Enrichment

REFER ALSO TO CITATION(S) 32582, 32583, 32596

32508 **(K/TS—11-862) Addendum to preliminary safety analysis report, Centrifuge Plant Demonstration Facility, Building K-1220.** (Oak Ridge Gaseous Diffusion Plant, TN (USA)). Apr 1987. Contract AC05-84OT21400. 130p. NTIS, PC A07. File Number DE87009707.

This report supplements the Preliminary Safety Analysis Report: Centrifuge Plant Demonstration Facility, Building K-1220, K/D-3924 (Draft), by (1) replying to detailed comments from Oak Ridge Operations (ORO) of the Department of Energy (DOE), (2) incorporating additional information, (3) reproducing a revised version of an earlier memo that addresses several important safety issues, and (4) including a revised list of general and specific safety criteria, safety definitions, and safety systems. The last item, and this supplement as a whole, reflects a revised view of which elements of a facility should be emphasized in a preliminary safety analysis report (PSAR). The original PSAR for the Centrifuge Plant Demonstration Facility (CPDF) was written to include capital equipment loss as a safety concern; this supplement views capital equipment loss as a safety concern only when such loss could affect the health and safety of the public or employees. Several of the detailed comments are answered by a reference to K/O-4036. The more important safety information, besides that given in the memo in Appendix A, is to be found in the replies to comments. It should be emphasized that this supplement, like the original CPDF PSAR, is a preliminary report prepared before the design was complete. In the judgment of the CPDF operating contractor, the conclusion stated in the summary chapter of the PSAR is still valid - the facility can be operated with no significant impact on the health and safety of the public and employees.

32509 **(POEF-T—3446) Instrumentation Technical Program Management Team: Annual report, FY-1986.** Hanson, M.L.; Fitzgerald, J.M.; Grametbauer, G.L. (Martin Marietta Energy Systems, Inc., Portsmouth, OH (USA). Quality and Technical Services Div.; Martin Marietta Energy Systems, Paducah, KY (USA); Martin Marietta Energy Systems, Inc., Oak Ridge, TN (USA)). 4 Mar 1987. Contract AC05-76OR00001. 24p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87008927.

This report deals with several projects carried out at the Portsmouth and Oak Ridge gaseous diffusion plants. Line recorders were installed at the Portsmouth plant to monitor gas constituents of the cascade process gas. Technical assessment was made of the shutdown of the Oak Ridge plant to identify potential problems. Progress was made on development of a computer-controlled gas recycle system at Oak Ridge. Monitoring instruments were developed for gases in standby cells at Oak Ridge. A criticality radiation alarm was installed at Portsmouth. A scintillation device was developed to monitor purge vent effluents at Portsmouth. The report concludes with a forecast of projects to be carried out in 1987. (JDH)

32510 **(UCRL—95079) Integration of the AVLIS [atomic vapor laser isotopic separation] process into the nuclear fuel cycle.** Hargrove, R.S.; Knighton, J.B.; Eby, R.S.; Pashley, J.H.; Norman, R.E. (Oak Ridge Gaseous Diffusion Plant, TN (USA); Lawrence Livermore National Lab., CA (USA)). Aug 1986. Contract W-7405-ENG-48. 57p. (CONF-860826—13). NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87010275.

From National meeting of the American Institute of Chemical Engineers; Boston, MA, USA (24 Aug 1986).

AVLIS RD and D efforts are currently proceeding toward full-scale integrated enrichment demonstrations in the late 1980's and potential plant deployment in the mid 1990's. Since AVLIS requires a uranium metal feed and produces an enriched uranium metal product, some change in current uranium processing practices are necessitated. AVLIS could operate with a UF_6-in UF_6-out interface with little effect to the remainder of the fuel cycle. This path, however, does not allow electric utility customers to realize the full potential of low cost AVLIS enrichment. Several alternative processing methods have been identified and evaluated which appear to provide opportunities to make substantial cost savings in the overall fuel cycle. These alternatives involve varying levels of RD and D resources, calendar time, and technical risk to implement and provide these cost reduction opportunities. Both feed conversion contracts and fuel fabricator contracts are long-term entities. Because of these factors, it is not too early to start planning and making decisions on the most advantageous options so that AVLIS can be integrated cost effectively into the fuel cycle. This should offer economic opportunity to all parties involved including DOE, utilities, feed converters, and fuel fabricators. 10 refs., 11 figs., 2 tabs.

0507 Fuels Production And Properties

REFER ALSO TO CITATION(S) 32510, 32515, 32521

32511 **(LA-UR—87-1835) Test ventilation with smoke, bubbles, and balloons.** Pickering, P.L.; Cucchiara, A.L.; McAtee, J.L.; Gonzales, M. (Los Alamos National Lab., NM (USA)). 1987. Contract W-7405-ENG-36. 8p. (CONF-870620—5). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010096.

From American Society of Heating, Refrigerating and Air-Conditioning Engineers meeting; Nashville, TN, USA (28 Jun 1987).

The behavior of smoke, bubbles, and helium-filled balloons was videotaped to demonstrate the mixing of air in the plutonium chemistry laboratories, a plutonium facility. The air-distribution patterns, as indicated by each method, were compared. Helium-filled balloons proved more useful than bubbles or smoke in the visualization of airflow patterns. The replay of various segments of the videotape proved useful in evaluating the different techniques and in identifying airflow trends responsible for air mixing. 6 refs.

0508 Spent Fuels Reprocessing

REFER ALSO TO CITATION(S) 32594, 33225

32512 **(CONF-870591—3) Remote handling facility and equipment used for space truss assembly.** Burgess, T.W. (Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 8p. NTIS, PC A02/MF A01; GPO Dep. File Number DE87009121.

From Goddard conference on space applications of artificial intelligence and robotics; Greenbelt, MD, USA (14 May 1987).

The ACCESS truss remote handling experiments were performed at Oak Ridge National Laboratory's (ORNL's) Remote Operation and Maintenance Demonstration (ROMD) facility. The ROMD facility has been developed by the US Department of Energy's (DOE's) Consolidated Fuel Reprocessing Program to develop and demonstrate remote maintenance techniques for advanced nuclear fuel reprocessing equipment and other programs of national interest. The facility is a large-volume, high-bay area that encloses a complete, technologically advanced remote maintenance system that first began operation in FY 1982. The maintenance system consists of a full complement of teleoperated manipulators, manipulator transport systems, and overhead hoists that provide the capability of performing a large variety of remote handling tasks. This system has been used to demonstrate remote manipulation techniques for the DOE, the Power Reactor and Nuclear Fuel Development Corporation (PNC) of Japan, and the US Navy in addition to the National Aeronautics and Space Administration. ACCESS truss remote assembly was performed in the ROMD facility using the Central Research Laboratory's (CRL) model M-2 servomanipulator. The model M-2 is a dual-arm, bilateral force-reflecting, master/slave servomanipulator which was jointly developed by CRL and ORNL and represents the state of the art in teleoperated manipulators commercially available in the United States today. The model M-2 servomanipulator incorporates a distributed, microprocessor-based digital control system and was the first successful implementation of an entirely digitally controlled servomani-

pulator. The system has been in operation since FY 1983. 3 refs., 2 figs.

32513 **(CONF-870601—1) Calculational assessment of critical experiments with mixed oxide fuel pin arrays moderated by organic solution.** Smolen, G.R. (Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 8p. NTIS, PC A02/MF A01; GPO Dep. File Number DE86014691.

From Annual meeting of the American Nuclear Society; Dallas, TX, USA (7 Jun 1987).

Critical experiments have been conducted with organic-moderated mixed oxide (MOX) fuel pin assemblies at the Pacific Northwest Laboratory (PNL) Critical Mass Laboratory (CML). These experiments are part of a joint exchange program between the United States Department of Energy (USDOE) and the Power Reactor and Nuclear Fuel Development Corporation (PNC) of Japan in the area of criticality data development. The purpose of these experiments is to benchmark computer codes and cross-section libraries and to assess the reactivity difference between systems moderated by water and those moderated by an organic solution. Past studies have indicated that some organic mixtures may be better moderators than water. This topic is of particular importance to the criticality safety of fuel processing plants where fissile material is dissolved in organic solutions during the solvent extraction process. In the past, it has been assumed that the codes and libraries benchmarked with water-moderated experiments were adequate when performing design and licensing studies of organic-moderated systems. Calculations presented in this paper indicated that the SCALE code system and the 27-energy-group cross-section accurately compute k-effectives for organic moderated MOX fuel-pin assemblies. Furthermore, the reactivity of an organic solution with a 32-vol-% TBP/68-vol-% NPH mixture in a heterogeneous configuration is the same, for practical purposes, as water. 5 refs.

32514 **(FRNC-TH—2661) Gas chromatographic analysis of extractive solvent in reprocessing plants.** Marlet, B. (Paris-13 Univ., 93 - Saint-Denis (France)). 1984. 167p. (In French). NTIS (US Sales Only), PC A08/MF A01. File Number DE87751838.

Operation of a reprocessing plant using the Purex process is recalled and analytical controls for optimum performance are specified. The aim of this thesis is the development of analytical methods using gas chromatography required to follow the evolution of the extraction solvent during spent fuel reprocessing. The solvent at different concentrations, is analysed along the reprocessing lines in organic or aqueous phases. Solvent degradation interferes with extraction and decomposition products are analysed. The solvent becomes less and less efficient, also it is distilled and quality is checked. Traces of solvent should also be checked in waste water. Analysis are made as simple as possible to facilitate handling of radioactive samples.

32515 **(INIS-mf—10631) Systems study 'Alternative Entsorgung'. 2. Part of final report. Technical annex 18. Calculation of environmental effects of nuclear fuel disposal devices.** Czapiewski, W. v.; Kreymborg, A.; Muenster, M.; Pink, P. (Gesellschaft fuer Umweltueberwachung m.b.H., Aldenhoven (Germany, F.R.); Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). Oct 1984. 89p. (In German). NTIS (US Sales Only), PC A05/MF A01. File Number DE87751921.

The collective dose due to normal operation of a reprocessing plant is considerably above the expected value of the collective dose in consequence of examined accidents in the reprocessing plant and in the model final stores. For 'integrated fuel disposal', the fuel circuit causes a collective dose, which is of the same order of magnitude as that of a nuclear power station. The collective dose of the fuel circuit (without a nuclear power station) is caused almost exclusively by normal operation of the reprocessing plant. The collective dose of the reprocessing plant is determined by gaseous radioactivity, where about 50% of the collective dose up to 1500 km originates from individual doses in the range between 10/sup -5/ and 10/sup -7/ Sv (1 mrem and 0.01 mrem). Retention of C14 and Kr 85 to 90% would reduce the collective dose in the reprocessing plant 700 by about 50%. For 'other fuel disposal techniques', the collective dose of the fuel circuit is about an order of magnitude lower than that of the nuclear power station. The collective dose of the fuel circuit without a nuclear power station up to 1500 km is practically exclusively determined by uranium ore mining, where individual doses below 10/sup -7/ Sv (0.01 mrem) contribute quite considerably.

32516 **(JOPAG—04.86-PRG-128) Joint programme on the technical development and further improvement of IAEA safeguards between the Government of the Federal Republic of Germany and the International Atomic Energy Agency. Task C.17. Operations manual for the KfK hybrid K-edge/K-XRF densitometer.** Eberle, H.; Ottmar, H. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.); International Atomic Energy Agency, Vienna (Austria); Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Kernphysik 3). Apr 1986. 67p. NTIS (US Sales Only), PC A04/MF A01. File Number DE87751899.

This report describes the design and operation of the KfK hybrid X-ray densitometer. The instrument, based on the techniques of K-edge X-ray absorptiometry and K X-ray fluorescence analysis, is primarily designed for a simultaneous assay of the uranium and plutonium concentrations in highly radioactive reprocessing input solutions. The element concentrations are measured with an accuracy of better than 0.3% (1σ) for uranium, and of 1% (1σ) for plutonium, respectively, in a 1000 s counting time.

32517 **(LA—10963-MS) Pyrochemical investigations into recovering plutonium from americium extraction salt residues.** Fife, K.W.; West, M.H. (Los Alamos National Lab., NM (USA)). May 1987. Contract W-7405-ENG-36. 30p. NTIS, PC A03/MF A01. File Number DE87009486.

Progress into developing a pyrochemical technique for separating and recovering plutonium from spent americium extraction waste salts has concentrated on selective chemical reduction with lanthanum metal and calcium metal and on the solvent extraction of americium with calcium metal. Both techniques are effective for recovering plutonium from the waste salt, although neither appears suitable as a separation technique for recycling a plutonium stream back to mainline purification processes. 17 refs., 13 figs., 2 tabs.

32518 **(NIIAR—15(696)) Some features of transplutonium and rare earth elements extraction by HDEHP from lactic acid solutions.** Nikolaev, V.M.; Lebedev, V.M.; Lebedeva, L.S. (Tsentral'nyj Nauchno-Issledovatel'skij Inst. Informatsii i Tekhniko-Ehkonomicheskikh Issledovanij po Atomnoj Nauke i Tekhnike, Moscow (USSR)). 1986. 12p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702390.

The mechanisms of transplutonium (TPE) and rare earth elements (REE) extraction by HDEHP from lactic acid solutions are analysed in the literature. On the base of the known expressions and experimental data the model for TPE and REE extraction by HDEHP from lactic acid, accounting lactic acid and metal extraction as MeA_3x3HA, $MeLA_3x2HA$ and $MeLA_3$ complexes, is suggested. The expression, permitting to estimate quantitatively the effect of TPE and REE complexing with lactic acid and the extraction of complex forms on the distribution coefficient of the extracted metal, is obtained. Comparison of calculational data with experimental ones show their good coincidence that confirms the rightness of the model accepted for extraction. 15 references, 6 figures.

0509 Transport And Storage

REFER ALSO TO CITATION(S) 32528, 32792, 33339

32519 (CONF-860932—, pp 39-42) **Uranium Yellow Cake accident - Wichita, Kansas.** Borchert, H.R. (Dept. of Health, Lincoln, NE). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

A tractor and semi trailer containing Uranium Yellow Cake, had overturned on I-235, Wichita, Kansas on Thursday, March 22,

1979. The truck driver and passenger were transported, with unknown injuries, to the hospital by ambulance. The shipment consisted of 54 drums of Uranium Ore Concentrate Powder. Half of the drums were damaged or had their lids off. Since it was raining at the time of the accident, plastic was used to cover the barrels and spilled material in an attempt to contain the yellow cake. A bulldozer was used to construct a series of dams in the median and the ditch to contain the run-off water from the contaminated area. Adverse and diverse weather conditions hampered the clean up operations over the next several days. The contaminated water and soil were shipped back to the mine for reintroduction into the milling process. The equipment was decontaminated prior to being released from the site. The clean up personnel wore protective clothing and respiratory protection equipment, if necessary. All individuals were surveyed and decontaminated prior to exiting the area.

32520 (CONF-860932—, pp 295-296) **Emergency response to transportation accidents.** Sakenas, C. (Nuclear Regulatory Commission, Washington, DC). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

The Nuclear Regulatory Commission (NRC) has issued a policy statement regarding its role in transportation accidents involving the release of radiation. Each State has the primary responsibility for protecting the health and safety of its citizens. States have chartered certain agencies with the responsibility of responding to radiological emergencies. When informed of a transportation accident, the NRC will notify the designated state agency to ensure that they have been informed of the incident and will offer NRC assistance. The NRC also will notify the US Department of Energy (DOE), the US Department of Transportation (DOT) and any other affected agency to ensure a coordinated Federal response. Under an existing NRC/DOT Memorandum of Understanding, NRC is responsible for investigating any accidents involving packages regulated by the NRC. NRC staff may be dispatched to an accident scene involving packages not regulated by NRC whenever significant amounts of radioactive material were or might be released and NRC activities will generally be limited to information collection unless assistance is requested. DOE would be available to assist State and local responders in monitoring and decontamination of affected areas. In an accident in which Federal assistance was being provided to the State, portions of the Federal Radiological Emergency Response Plan would be activated to coordinate the provision of that assistance. An example of recent experience in responding to a transportation event will be discussed.

32521 (HEDL-SA—3168-FP) **Effect of cladding defect size on the oxidation of irradiated spent LWR [light-water reactor] fuel below 369°C.** Einziger, R.E.; Strain, R.V. (Hanford Engineering Development Lab., Richland, WA (USA); Argonne National Lab., IL (USA)). 17 Oct 1984. Contract AC06-76FF02170. 29p. (CONF-841094—6). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87008383.

From International workshop on irradiated fuel storage–operating experience and development programs; Toronto, Ontario, Canada (17 Oct 1984).

Tests on spent fuel fragments and rod segments were conducted between 250 and 360°C to relate temperature, defect size, and fuel oxidation rate with time-to-cladding-splitting. Defect sizes from 760 μm diameter down to 8 μm, the size of an SCC type breach, were used. Above 283°C, the time-to-cladding-splitting was longer for the smaller defects. The enhancement of the incubation time by smaller defects steadily decreased with temperature and was not detected at 250°C. 18 refs., 10 figs., 4 tabs.

32522 (INIS-mf—10884, pp 361-373) **Road transport of radioactive wastes.** Bartos, V.; Vesely, P.; Smolik, V.; Bartosova, H.; Rada, J.; Jirasek, T. (Vyvojovy Zavod Uranoveho Prumyslu, Zbraslav nad Vltavou, Czechoslovakia; Vysoka Skola Sboru Narodni Bezpecnosti, Prague, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

A wide range of equipment was developed for securing the safe transport of radioactive wastes from nucler power plants to regional disposal sites along public roads. The equipment includes four types of containers, two types of clamping device for various types of containers and a three-axle platform trailer with a total length of 12.2 m and a maximum tonnage of 30 tons of radioactive material. A two-axle towing vehicle - the LIAZ 122 was developed specially for this type of trailer and will be put in series production in 1988. As a follow-up to the development of the said equipment a draft of regulations was issued ruling the road transport of radioactive wastes which proceeds mainly from the application of IAEA regulations for the transport of radioactive materials and from the agreement of member countries of the Economic Commission for Europe on the road transport of dangerous goods. The draft specifies the technical equipment of vehicles, the professional training of drivers and conditions ruling the choice of the transport route, as well as an accident code which determines different types of accidents, namely accidents without and with radiation hazard, emergencies and radiation accidents. (Z.M.).

32523 (PNL—6206-Vol.1) **HYDRA-II: A hydrothermal analysis computer code: Volume 1, Equations and numerics.** McCann, R.A. (Pacific Northwest Lab., Richland, WA (USA)). Apr 1987. Contract AC06-76RL01830. 41p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87010326.

HYDRA-II is a hydrothermal computer code capable of three-dimensional analysis of coupled conduction, convection, and thermal radiation problems. This code is especially appropriate for simulating the steady-state performance of spent fuel storage systems. The code has been evaluated for this application for the US Department of Energy's Commercial Spent Fuel Management Program. HYDRA-II provides a finite difference solution in Cartesian coordinates to the equations governing the conservation of mass, momentum, and energy. A cylindrical coordinate system may also be used to enclose the Cartesian coordinate system. This exterior coordinate system is useful for modeling cylindrical cask bodies. The difference equations for conservation of momentum are enhanced by the incorporation of directional porosities and permeabilities that aid in modeling solid structures whose dimensions may be smaller than the computational mesh. The equation for conservation of energy permits of modeling of orthotropic physical properties and film resistances. Several automated procedures are available to model radiation transfer within enclosures and from fuel rod to fuel rod. The documentation of HYDRA-II is presented in three separate volumes. This volume, Volume I - Equations and Numerics, describes the basic differential equations, illustrates how the difference equations are formulated, and gives the solution procedures employed. Volume II - User's Manual contains code flow charts, discusses the code structure, provides detailed instructions for preparing an input file, and illustrates the operation of the code by means of a model problem. The final volume, Volume III - Verification/Validation Assessments, presents results of numerical simulations of single- and multiassembly storage systems and comparisons with experimental data. 4 refs.

32524 (SAND—86-7135) **One-twelfth-scale model of horizontal emplacement and retrieval equipment for radioactive waste packages at the proposed repository in tuff.** White I.B.; Graham, R.E.; Frostenson, J.C. (Los Alamos Technical Associates, Inc., NM (USA)). Dec 1986. Contract AC04-76DP00789. 91p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE87009354.

One of the principal objectives of the Nevada Nuclear Waste Storage Investigations [NNWSI] Project is the design of equipment and hardware for the emplacement and retrieval of packages of high-level radioactive waste at a proposed repository in tuff at Yucca Mountain, Nevada. This report presents a description of the emplacement and retrieval operations and a one-twelfth-scale model of the equipment and hardware to be used for the horizontal orientation. The model was constructed to demonstrate the technical feasibility of the proposed horizontal concept and for the purpose of design verification. 1 ref., 38 figs., 3 tabs.

32525 (UCRL—53762) Spent-Fuel Test - Climax: An evaluation of the technical feasibility of geologic storage of spent nuclear fuel in granite: Executive summary of final results. Patrick, W.C. (Lawrence Livermore National Lab., CA (USA)). 2 Sep 1986. Contract W-7405-ENG-48. 21p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009999.

This summary volume outlines results that are covered in more detail in the final report of the Spent-Fuel Test - Climate project. The project was conducted between 1978 and 1983 in the granitic Climax stock at the Nevada Test Site. Results indicate that spent fuel can be safely stored for periods of years in this host medium and that nuclear waste so emplaced can be safely retrieved. We also evaluated the effects of heat and radiation (alone and in combination) on emplacement canisters and the surrounding rock mass. Storage of the spent-fuel affected the surrounding rock mass in measurable ways, but did not threaten the stability or safety of the facility at any time.

0510 Marketing, Economics, And By-products

REFER ALSO TO CITATION(S) 32510

0520 Waste Management

REFER ALSO TO CITATION(S) 32515, 32524, 32525, 32589, 32595, 32890, 32943, 33151, 33338, 33978, 34451

32526 (BNL—52020) Development of a computerized data base for low-level radioactive waste leaching data: Topical report. Dougherty, D.R.; Colombo, P. (Brookhaven National Lab., Upton, NY (USA)). Sep 1986. Contract AC02-76CH00016. 183p. NTIS, PC A09/MF A01; 1; GPO Dep. File Number DE87008602.

This report documents the development of a computerized data base (db) of leaching data for solidified low-level radioactive waste (LLW) forms. Brookhaven National Lab performed this work under contract with the US Department of Energy's Low-Level Waste Management Program as part of an effort to develop an accelerated leach test(s) that can be used to predict leachabilities of LLW forms over long time periods, i.e., hundreds of years. The accelerated leach test(s) is (are) to be developed based on knowledge of leaching mechanisms and factors that affect leaching. Although developed specifically for the Accelerated Leach Test(s) Program, this db may be useful to others concerned with the management of low-level waste. The db is being developed to provide efficient data compilation and analysis capabilities. The data compiled in the db, which include data from the Accelerated Leach Test(s) Program and selected data from the literature, have been selected to elucidate leaching mechanisms and factors that affect leaching and are not meant to be a comprehensive compilation of leaching data. This report presents the data compilation aspect of the db. It does not present the programmatic results obtained from analysis of the data regarding leaching mechanisms and factors that affect leaching, which will be presented in reports from the Accelerated Leach Test(s) Program. 6 refs.

32527 (CONF-870306—46) Status of the Oak Ridge National Laboratory new hydrofracture facility: Implications for the disposal of liquid low-level radioactive wastes by underground injection. Haase, C.S.; Stow, S.H. (Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 20p. NTIS, PC A02. File Number DE87009667.

From Waste management '87; Tucson, AZ, USA (1 Mar 1987).

From 1982 to 1984, Oak Ridge National Laboratory (ORNL) disposed of approximately 2.8 x 10^{16} Bq (7.5 x 10^{5} Ci) of liquid low-level radioactive wastes by underground injection at its new hydrofracture facility. This paper summarizes the regulatory and operational status of that ORNL facility and discusses its future outlook. Operational developments and regulatory changes that have raised major questions about the continued operation of the new hydrofracture facility include: (1) significant ^{90}Sr contamination of some groundwater in the injection formation; (2) questions about the design of the injection well, completed prior to the application of the underground injection control (UIC) regulations to the ORNL facility; (3) questions about the integrity of the reconfigured injection well put into service following the loss of the initial injection well; and (4) implementation of UIC regulations. Ultimately, consideration of the regulatory and operational factors led to the decision in early 1986 not to proceed with a UIC permit application for the ORNL facility. Subsequent to the decision not to proceed with a UIC permit application, closure activities were initiated for the ORNL hydrofracture facility. Closure of the facility will occur under both state of Tennessee and federal UIC regulations. The facility also falls under the provisions of part 3004(u) of the Resource Conservation and Recovery Act pertaining to corrective actions. Nationally, there is an uncertain outlook for the disposal of wastes by underground injection. All wells used for the injection of hazardous wastes (Class I wells) are being reviewed. 8 refs., 4 figs., 2 tabs.

32528 (DOE/DP—0038) FY 1987 program summary document: Office of Defense Waste and Transportation Management. (USDOE Assistant Secretary for Defense Programs, Washington, DC). Apr 1987. 82p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE87008917.

This document describes the Office of Defense Waste and Transportation Management (DWTM) Program as supported by the President's Fiscal Year (FY) 1987 Budget Request to Congress. It specifically addresses the program's organization, objectives, strategies, and plans for FY 1987.

32529 (DOE/ET/44802—T19) US Geological Survey research in radioactive waste disposal: Fiscal Years, 1983, 1984, and 1985. Dinwiddie, G.A.; Trask, N.J. (Geological Survey, Reston, VA (USA)). 1986. Contract AI08-78ET44802. 14p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010568.

The USGS has been assisting the DOE in evaluating the suitability of the Yucca Mountain area, located on and adjacent to the Nevada Test Site (NTS) and about 160 km northwest of Las Vegas, as a possible repository site for the disposal of commercially generated high-level radioactive wastes and wastes from DOE facilities. An essential part of this work is defining the geology and hydrology of the area in order to assess the potential for the transport of radionuclides from a repository to the human environment. In addition, the potential for disruption of a repository as a result of volcanic or tectonic activity or accelerated erosion is being evaluated. As part of the Nevada Nuclear Waste Storage Investigations (NNWSI) project, the USGS is performing multi-disciplinary studies involving detailed surface mapping, surface geophysics, exploratory drilling, borehole geophysics, and topical studies of hydrology, climate, and tectonics. Studies are being performed to assess the potential for faulting, damaging earthquakes, recurrence of volcanism, and local acceleration of erosion in parts of the southern Great Basin. Hydrologic investigations are directed to determination of present and past hydrologic regimes of the NTS and vicinity in order to predict the potential for ground-water transport of radioactive waste from a repository in Yucca Mountain to the accessible environment. Paleoclimatic studies are also being performed to aid in predicting future climate in the NTS vicinity.

32530 (DOE/NE/44353—3) Rhode Island crystalline repository siting project: Technical progress report, Calendar year 1986. Vild, B. (Rhode Island Dept. of Administration, Providence (USA). Div. of Planning). 1987. Contract FG02-83NE44353. 7p. NTIS, PC A02/MF A01; GPO Dep. File Number DE87007734.

A Nuclear Waste Fund established by the Nuclear Waste Policy Act of 1982 provides financial support to affected states to participate in the high-level radioactive waste repository siting program of the US Department of Energy. In Rhode Island, that function was performed by a multidisciplinary Project Review Team consisting of staff from three State agencies. Members of the Review Team attended several meetings in 1986 to discuss mutual concerns with Federal, State and Tribal officials. Comments were developed on DOE's Draft Area Recommendation Report. Members of the Review Team also testified at a public hearing in Providence on the Draft ARR, and developed and distributed a public

information booklet. In May, Secretary of Energy John Herrington announced the suspension of the crystalline repository siting program. The remainder of the year was spent monitoring litigation challenging that decision and pending legislation. Administrative phase-down of the program was essentially complete by the close of the calendar year.

32531 **(DOE/OR/00033—T313) Radioactive waste management: Colloidal adsorption of cations and anions: Final technical report.** Balam, B.S. (Mississippi State Univ., Mississippi State (USA)). 15 Mar 1987. Contract AC05-76OR00033. 6p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009958.

On the basis of the current investigation, the following conclusions for relevant radwaste disposal applications may be drawn: (1) Kaolinite (Georgia and New Mexico) and Illite (Illinois) clays may be used to preferentially adsorb monovalent (e.g. Cesium) cations, whereas, Montmorillonite (Wyoming) may be used to adsorb and retain divalent (e.g. Strontium) cations from radioactive waste solutions. (2) Montmorillonite (Wyoming) and Vermiculite (Idaho) clay minerals can be used effectively as packing materials around the solid radioactive waste containers. (3) Suitability of other colloidal materials for radioactive waste disposal based on their binding and release characteristics can be determined by evaluating their fraction active and analyses of the Donnan equilibrium systems. Most of the basic techniques for the investigation of cationic activities, preparation of colloidal materials with variable cation saturation and setting up of Donnan equilibrium systems have been developed and tried. The laboratory facilities and equipment to handle the work with radioisotopes are now available at MVSU as a result of the current DOE project. The results obtained so far are encouraging but there is need to test their validity using simulated radioactive waste materials and tracers.

32532 **(DOE/OR/20722—150) Niagara Falls Storage Site, Annual site environmental report, Lewiston, New York, Calendar year 1986: Surplus Facilities Management Program (SFMP).** (Bechtel National, Inc., Oak Ridge, TN (USA)). Jun 1987. Contract AC05-81OR20722. 79p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE87010560.

During 1986, the environmental monitoring program was continued at the Niagara Falls Storage Site (NFSS), a US Department of Energy (DOE) surplus facility located in Niagara County, New York, presently used for the interim storage of radioactive residues and contaminated soils and rubble. The monitoring program is being conducted by Bechtel National, Inc. The monitoring program at the NFSS measures radon gas concentrations in air; external gamma radiation levels; and uranium and radium concentrations in surface water, groundwater, and sediment. To verify that the site is in compliance with the DOE radiation protection standard and to assess its potential effect on public health, the radiation dose was calculated for the maximally exposed individual. Based on the conservative scenario described in the report, this individual would receive an annual external exposure approximately equivalent to 6% of the DOE radiation protection standard of 100 mrem/yr. By comparison, the incremental dose received from living in a brick house versus a wooden house is 10 mrem/yr above background. The cumulative dose to the population within an 80-km (50-mi) radius of the NFSS that would result from radioactive materials present at the site would be indistinguishable from the dose that the same population would receive from naturally occurring radioactive sources. Results of the 1986 monitoring show that the NFSS is in compliance with the DOE radiation protection standard. 14 refs., 11 figs., 14 tabs.

32533 **(DP-MS—86-74) Remote viewing of melter interior Defense Waste Processing Facility.** Heckendorn, F.M. II. (Savannah River Lab., Aiken, SC (USA)). 1986. Contract AC09-76SR00001. 19p. (CONF-861102—43). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010203.

From American Nuclear Society and Atomic Industrial Forum joint meeting; Washington, DC, USA (16 Nov 1986).

A remote system has been developed and demonstrated for continuous reviewing of the interior of a glass melter, which is used to vitrify highly radioactive waste. The system is currently being implemented with the Defense Waste Processing Facility (DWPF) now under construction at the Savannah River Plant (SRP). The environment in which the borescope/TV unit is implemented combines high temperature, high ionizing radiation, low light, spattering, deposition, and remote maintenance.

32534 **(DP-MS—86-79) The remote handling of canisters containing nuclear waste in glass at the Savannah River Plant.** Callan, J.E. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Plant). 1986. Contract AC09-76SR00001. 6p. (CONF-861102—45). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010190.

From American Nuclear Society and Atomic Industrial Forum joint meeting; Washington, DC, USA (16 Nov 1986).

The Defense Waste Processing Facility (DWPF) is a complete production area being constructed at the Savannah River Plant for the immobilization of nuclear waste in glass. The remote handling of canisters filled with nuclear waste in glass is an essential part of the process of the DWPF at the Savannah River Plant. The canisters are filled with nuclear waste containing up to 235,000 curies of radioactivity. Handling and movement of these canisters must be accomplished remotely since they radiate up to 5000 R/h. Within the Vitrification Building during filling, cleaning, and sealing, canisters are moved using standard cranes and trolleys and a specially designed grapple. During transportation to the Glass Waste Storage Building, a one-of-a-kind, specially designed Shielded Canister Transporter (SCT) is used. 8 figs.

32535 **(DP-MS—86-101) Material interactions relating to long-term geologic disposal of nuclear waste glass.** Bibler, N.E.; Jantzen, C.M. (Savannah River Lab., Aiken, SC (USA)). 1986. Contract AC09-76SR00001. 33p. (CONF-861207—105). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87010204.

From Materials Research Society fall meeting; Boston, MA, USA (1 Dec 1986).

This review paper systematizes the additional interactions that materials in a geologic repository will impose on the borosilicate glass waste form-groundwater interactions. These materials are the steel canister that holds the glass, the steel overpack over the canister, backfill materials that may be used, and last, the repository host rock. The repository geologies reviewed are tuff, salt, basalt, and granite. The interactions emphasized are those appropriate to conditions expected after repository closure, e.g., oxic vs anoxic conditions. Whenever possible, the effect of radiation from the waste form on the interaction(s) is examined. The interactions are evaluated based on their effect on the release and speciation of various elements including radionuclides from the glass. Repository relevant interactions testing that requires further study before long-term predictions can be made are noted. 62 refs.

32536 **(DP-MS—86-104) Soil characteristics as criteria for cathodic protection of a nuclear fuel production facility.** Jenkins, C.F.; Corbett, R.A. (Savannah River Lab., Aiken, SC (USA); Corrosion Testing Lab., Inc., Newark, DE (USA)). 1987. Contract AC09-76SR00001. 26p. (CONF-8705115—1). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87010196.

From Effects of soil characteristics on corrosion symposium; Cincinnati, OH, USA (12 May 1987).

The fact that buried metallic structures corrode is well documented. It has been postulated that the extent and rate of attack is controlled predominantly by the characteristics of the surrounding soil. Therefore, prior to constructing a new facility designed to process accumulated nuclear waste, consideration was given to protecting its underground pipelines against corrosion. Leak frequency curves from other nearby plantsites, extensive soil resistivity surveys, and geochemical analyses, were used to evaluate the onsite soil characteristics for corrosion susceptibility. Analysis of the data collected over a three-year period indicated that although the soil is not overly aggressive, substantial heterogeneity existed so as to establish galvanic cells along pipe lengths passing through the soil. To limit the extent of corrosion on underground piping, the application of an impressed current cathodic protection system was recommended to supplement a high integrity, corrosion resistant coating and wrap system.

32537 (DP-MS—86-171) The Savannah River Plant Consolidated Incineration Facility. Weber, D.A. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Plant). 1987. Contract AC09-76SR00001. 8p. (CONF-870429—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010070.

From 6. annual conference on incineration of mixed and low-level radioactive wastes; St. Charles, IL, USA (22 Apr 1987).

A full scale incinerator is proposed for construction at the Savannah River Plant (SRP) beginning in August 1989 for detoxifiction and volume reduction of liquid and solid low-level radioactive, mixed and RCRA hazardous waste. Wastes to be burned include drummed liquids, sludges and solids, liquid process wastes, and low-level boxed job control waste. The facility will consist of a rotary kiln primary combustion chamber followed by a tangentially fired cylindrical secondary combustion chamber (SCC) and be designed to process up to 12 tons per day of solid and liquid waste. Solid waste packaged in combustible containers will be fed to the rotary kiln incinerator using a ram feed system and liquid wastes will be introduced to the rotary kiln through a burner nozzle. Liquid waste will also be fed through a high intensity vortex burner in the SCC. Combustion gases will exit the SCC and be cooled to saturation in a spray quench. Particulate and acid gas are removed in a free jet scrubber. The off-gas will then pass through a cyclone separator, mist eliminator, reheater high efficiency particulate air (HEPA) filtration and induced draft blowers before release to the atmosphere. Incinerator ash and scrubber blowdown will be immobilized in a cement matrix and disposed of in an onsite RCRA permitted facility. The Consolidated Incineration Facility (CIF) will provide detoxification and volume reduction for up to 560,000 CUFT/yr of solid waste and up to 35,700 CUFT/yr of liquid waste. Up to 50,500 CUFT/yr of cement stabilized ash and blowdown will beproduced for an average overall volume reduction fator of 22:1. 3 figs., 2 tabs.

32538 (EGG-M—09187) INEL RCRA [Resource Conservation and Recovery Act] permit for incineration of hazardous waste: Status report. McFee, J.N.; Dalton, J.D.; Bohrer, H.A. (EG and G Idaho, Inc., Idaho Falls (USA)). 1987. Contract AC07-76ID01570. 16p. (CONF-8705104—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE87009731.

From Conference on the incineration of mixed and LLW; Chicago, IL, USA (1 May 1987).

The Waste Experimental Reduction Facility (WERF) was constructed to reduce the volume of low-level radioactive waste at the Idaho National Engineering Laboratory (INEL). To address the problem of radioactively contaminated ignitable hazardous waste resulting from INEL activities, a development program was carried out to evaluate WERF's ability to meet the regulated criteria for incinerating liquid and solid ignitable waste. Concurrently, INEL submitted its hazardous waste Part B application under the Resource Conservation and Recovery Act (RCRA). As required, and as a major step in the permitting process, the WERF incinerator portion of the permit application included a proposed trial burn, which is a demonstration test of the incinerator's ability to destroy hazardous materials. The trial burn plan was designed to demonstrate the system performance for liquid and solid ignitable wastes at three operating conditions, using a prepared mix of materials representative of waste to be processed. EPA Region X reviewed and commented on the plan prior to the trial burn. Results of the liquid feed trial burn showed a greater than 97% probability of meeting the RCRA-dictated DRE value for chlorinated solvents and a greater than 99% probability for nonchlorinated solvents. Nonchlorinated solid waste results were calculated at a 93% probability of meeting the required DRE, with a 75% probability for chlorinated solid wastes. In addition, the incinerator DRE continued to improve long after the assumed pre-test equilibrium period had ended. The trial burn demonstrates that the WERF incinerator can safely and adequately destroy ignitable hazardous and mixed waste and provides a significant enhancement of the INEL's waste management system.

32539 (EGG-M—28786) Field testing of waste forms using lysimeters. McConnell, J.W. Jr.; Rogers, R.D. (EG and G Idaho, Inc., Idaho Falls (USA)). 1987. Contract AC07-76ID01570. 7p. (CONF-870306—45). NTIS MF A01; 2; GPO Dep. File Number DE87009417.

From Waste management '87; Tucson, AZ, USA (1 Mar 1987).

The Low-Level Waste Data Base Development - EPICOR-II Resin/Liner Investigation Program funded by the US Nuclear Regulatory Commission is obtaining information on performance of radioactive waste in a disposal environment. Waste forms manufactured from ion exchange resins used to clean up water from the accident at Three Mile Island Nuclear Power Station are being examined in field tests. This paper presents a description of the field testing and results from the first year of operation. 8 refs., 8 figs., 4 tabs.

32540 (EGG-WT—7623) Lead and silver zeolite characterization conducted at the Idaho National Engineering Laboratory. Boehmer, A.M.; Mitchell, N.G. (EG and G Idaho, Inc., Idaho Falls (USA)). Mar 1987. Contract AC07-76ID01570. 83p. NTIS, PC A05. File Number DE87009647.

The INEL currently has a documented inventory of 5,957,965 pounds of lead in various forms and states of use. The actual amount of lead is somewhat less since the total weight of casks containing lead, not the net weight of the lead itself, was used. This amount will be somewhat larger when data on in-use lead from ICPP and data on the lead inventory at NRF are included. The INEL lead inventory consists of: 2,583,216 pounds of clean lead in use; 940,189 pounds of clean, excess lead; 2,125,587 pounds of radioactively contaminated lead in use; and 353,973 pounds of radioactively contaminated excess lead. The objective of the lead program is to minimize the amount of lead waste generated at the INEL. This will be accomplished by the direct reuse of lead where possible and the development of treatment methods to facilitate recycling of the present lead inventory. The objective of the silver zeolite characterization, which detailed 10,304 pounds of silver zeolite, is to provide a baseline to be used in the reclamation process. This process has already proved feasible and will be used when the silver zeolite is considered a waste.

32541 (EPRI-NP—4938) Methodology for calculating combustible gas concentration in radwaste containers: Final report. Deltete, C.P. (Analytical Resources, Inc., Wyomissing, PA (USA); Electric Power Research Inst., Palo Alto, CA (USA)). Mar 1987. 94p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920349.

In September 1984, the US Nuclear Regulatory Commission (NRC) issued I & E Notice No. 84-72 dealing with the generation of hydrogen (H_2) and other combustible gases in radioactive waste containers. As an alternative to the tests and/or measurements required by the Notice, a calculational procedure was developed to predict the concentration of H_2 present inside a waste container after a specified storage duration. The calculational methodology determines the total dose absorbed by the waste as a function of curie loading, waste density, and container geometry, and then calculates H_2 generation as a function of absorbed dose and a predetermined gas generation constant. To "benchmark" the theoretical predictions against actual gas measurements from representative waste packages, liners containing dewatered resin waste that originated during cleanup operations at Three Mile Island Unit 2 (TMI-2) were used for comparison. On average, the predicted H_2 gas concentrations using the calculational model were within 20% of the H_2 concentrations measured when the liners were vented prior to shipment. The entire calculational procedure has been implemented on a desk top computer "electronic spreadsheet," designed to be a simple, easy-to-implement tool to calculate H_2 generation in waste containers with minimal input by the user. Accompanying this report diskette containing the spreadsheet translated into several computer languages for use with various systems. 8 refs., 4 figs., 5 tabs.

32542 **(INIS-mf—10619) Events of radioactive waste management - a chronological table.** (Deutsche Gesellschaft fuer Wiederaufarbeitung von Kernbrennstoffen m.b.H. (DWK), Hannover (Germany, F.R.)). 1985. 31p. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE87751903.

In chronological order the leaflet abstracted points out the essential data of German radioactive waste management. The data reach from December 1951 with EBR I (Idaho/USA) being the first one to feed electric power to the distribution grid to February 1985 known as the date of the submission of building applications for the first partial license of the Wackersdorf reprocessing plant.

32543 **(INIS-mf—10627) Systems study 'Alternative Entsorgung'. Final report. Technical annex 6. Technical description of conditioning plant for other spent fuel handling techniques.** (Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.); Deutsche Gesellschaft fuer Wiederaufarbeitung von Kernbrennstoffen m.b.H. (DWK), Hannover (Germany, F.R.); Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). Aug 1984. 231p. (In German). NTIS (US Sales Only), PC A11/MF A01. File Number DE87751909.

In the conditioning plant, fuel elements which have been stored for ten years are loaded into transport containers, unloaded, identified and welded into a dry storage box. The dry store barrel is introduced into a final storage container, which, after being closed, is packed in lost shielding. This so-called final storage barrel is finally placed in a transport container and leaves the conditioning plant in this form by rail for transport to the final storage mine. The fuel element method of treatment 'packing of three complete fuel elements' was used as the reference process. In addition, the method of treatment 'fuel elements dismantled into fuel rods' was also examined. The handling of fuel elements and secondary waste treatment in the reference process are described in detail.

32544 **(INIS-mf—10629) Systems study Alternative Entsorgung'. Final report. Technical annex 4. Safety related work on the conditioning plant for other fuel removal techniques.** (Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.); Deutsche Gesellschaft fuer Wiederaufarbeitung von Kernbrennstoffen m.b.H. (DWK), Hannover (Germany, F.R.); Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). Aug 1984. 212p. (In German). NTIS (US Sales Only), PC A10/MF A01. File Number DE87751905.

The investigations extend over the personnel, organisational, spatial and equipment conditions, which guarantee the protection of the people employed in the plant, the protection of the plant and the protection of the environment in correct operation and during accidents to the required extent and sufficiently accurately and reliably. The results show that safe enclosure is guaranteed and it is ensured that all exposure to radiation or contamination of persons, goods or the environment is kept as low as possible below the limits laid down in the Radiation Protection Ordinance, taking into account the state of science and technology and all the individual circumstances. The equipment is available and the measures are taken which are necessary to comply with the protection regulations.

32545 **(INIS-mf—10633) Systems study 'Alternative Entsorgung'. Final report. Technical annex 7. Safety-related work on fuel storage for other fuel disposal techniques.** Engelmann, H.J. (Deutsche Gesellschaft zum Bau und Betrieb von Endlagern fuer Abfallstoffe m.b.H., Peine (Germany, F.R.); Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). Oct 1984. 123p. (In German). NTIS (US Sales Only), PC A06/MF A01. File Number DE87751912.

A radiation protection concept was worked out for final storage of spent fuel elements. It contains the areas of instrumentation and equipment with the necessary devices and measuring equipment for monitoring emission and the room air, personnel dosimetry, measuring contamination, local dose rate measurements and division into radiation protection areas. The barrel incoming inspection is described. The work for determining the radiological load of the operating staff and the environment for correct and incorrect operation is also described. The radiological load of the operating staff for correct operation was determined in the form of the collective dose with dose factors in accordance with ICRP and individual doses according to Radiation Protection Ordinance. The collective dose is 0.28 pers. Sv/a and the maximum individual dose remains below 1.0 E-2 Sv/a. The individual doses determined remain below the permitted limits of Radiation Protection Ordinance. In the context of accident analysis, it was found that no accidents occur, which load the operating staff radiologically above the permitted limits of the Radiation Protection Ordinance. A probability consideration of accidents shows that the accident risk of the operating staff is several orders of magnitude below that of the normal operating risk.

32546 **(INIS-mf—10634) Systems study 'Alternative Entsorgung'. Final report. Technical annex 10. Study on checking the accessibility of spent fuel elements in a fuel store. Phase 1.** Hartje, B.; Kronschnabel, H.; Mueller, W.F.W. (Noell G.m.b.H., Wuerzburg (Germany, F.R.). Abt. Kernenergietechnik; Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). Jan 1984. 102p. (In German). NTIS (US Sales Only), PC A06/MF A01. File Number DE87751910.

There is an investigation whether accessibility can be produced to fuel elements stored in a salt mine. All solutions of the problem were followed up until the technically best one was found. Two conditions must be fulfilled for access to the final storage barrel: - There must be a climate which is suitable for people. The Mining Order is the basis for this. - The pit building must be fixed, in the convergence in the salt mine should not lead to it becoming impossible to reach part of the mine. Due to heat-producing waste, rock temperatures are caused in the salt mine, in which mining is no longer possible. Building on the idea of cooling the whole final storage area using concentric sections, the amount of heat to be removal was first estimated. Cooling of the whole final storage area proved to be technically unjustifiable and uninteresting at present.

32547 **(INIS-mf—10637) Systems study 'Alternative Entsorgung'. Final report. Technical annex 23. Concept of fuel element processing and final storage in barrels analogous to HAW [Highly-active wastes] glass moulds.** (Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.); Deutsche Gesellschaft fuer Wiederaufarbeitung von Kernbrennstoffen m.b.H. (DWK), Hannover (Germany, F.R.); Deutsche Gesellschaft zum Bau und Betrieb von Endlagern fuer Abfallstoffe m.b.H., Peine (Germany, F.R.); Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). Nov 1984. 230p. (In German). NTIS (US Sales Only), PC A11/MF A01. File Number DE87751925.

Reprocessing is not sensible for a number of certain spent fuel elements. From this point of view, it is necessary to develop a concept which takes into account the final storage of vitrified fission products and also fuel elements which are not processed. The aim of the mixed fuel processing concept is to design a method of treatment, which provides externally identical final storage barrels for both ways of fuel disposal and which provides associated standardized handling equipment. The study shows a way which provides for the packing of processed spent fuel elements in moulds with the external dimensions of the HAW mould and which makes it possible to store these fuel element final storage moulds together with HAW moulds in boreholes.

32548 (INIS-mf—10884, pp 324-340) **Geological aspects of radioactive waste disposal.** Kobera, P. (Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

Geological formations suitable for burying various types of radioactive wastes are characterized applying criteria for the evaluation and selection of geological formations for building disposal sites for radioactive wastes issued in IAEA technical recommendations. They are surface disposal sites, disposal sites in medium depths and deep disposal sites. Attention is focused on geological formations usable for injecting self-hardening mixtures into cracks

prepared by hydraulic decomposition and for injecting liquid radioactive wastes into permeable rocks. Briefly outlined are current trends of the disposal of radioactive wastes in Czechoslovakia and the possibilities are assessed from the geological point of view of building disposal sites for radioactive wastes on the sites of Czechoslovak nuclear power plants at Jaslovske Bohunice, Mochovce, Dukovany, Temelin, Holice (eastern Bohemia), Blahoutovice (northern Moravia) and Zehna (eastern Slovakia). It is stated that in order to design an optimal method of the burial of radioactive waste it will be necessary to improve knowledge of geological conditions in the potential disposal sites at the said nuclear plants. There is usually no detailed knowledge of geological and hydrological conditions at greater depths than 100 m. (Z.M.).

32549 (INIS-mf—10884, pp 246-251) **Compacting of soft wastes.** Tittlova, E.; Horucka, S.; Zboray, L. (Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice, Czechoslovakia; Atomova Elektraren Bohunice, Jaslovske Bohunice, Czechoslovakia). 1985. (In Slovak). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

A system of waste sorting is being prepared for the disposal of solid radioactive wastes from the V-1 nuclear power plant. Twenty types of waste are now sorted into ten materials groups: two groups of unambiguously incinerable wastes, three groups of compactable wastes and five groups where so far no processing prior to deposition has been considered. The studies have indicated that the V-1 nuclear power plant generates a considerable amount of waste which may be compacted with a low-pressure press. For the said purposes a commercial PL-12 press was adjusted in order to allow compacting wastes into standardized drums with a volume of 200 litres and to provide, in addition, radiation protection of personnel. The first problem was resolved by changing the longitudinal profile of the press ram into a circular ram to fit the dimensions of the drums. Without any interference in the hydraulic system the design also allowed to double specific pressure (0.5 MPa). The required radiation protection of personnel is provided by the withdrawal of aerosols from the working area of the press into the central air technology system. During experimental trials 95 m^3 of radioactive wastes were processed into 108 drums with a volume of 0.2 m^3 each. At present ca 95% of wastes from the annual volume of ca 180 m^3 are compacted. The volume reduction factor ranges from 4.1 to 4.5. (Z.M.).

32550 (INIS-mf—10884, pp 252-259) **Incineration of soft radioactive wastes.** Broz, J.; Tittlova, E.; Gulis, G.; Hladky, E. (Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

One nuclear power plant unit with a WWER-440 reactor will generate an annual 10 tons of soft incinerable wastes. Of this 33% is paper, 28% textiles, 14% PVC, 16% polyethylene and 9% rubber. Trial incineration of actual wastes in an incineration unit outside of the nuclear power plant showed that incineration quality, i.e., low escape of radioactive materials and low ash content, increases with decreasing temperature in the combustion chamber and with decreasing air flow. At best quality the following results were achieved: specific emission 100 mg/m^3 and ash content 50%. The trials allowed to design an experimental incineration plant for the Jaslovske Bohunice nuclear power plant which has already been put under construction. The incineration plant is to serve the disposal of a part of wastes from the V-1 and V-2 power plants but mainly the testing of research results for the development of commercial incineration plants for radiactive wastes. (Z.M.).

32551 (INIS-mf—10884, pp 260-264) **Fragmentation of solid radioactive wastes.** Frano, L.; Tittlova, E. (Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice, Czechoslovakia). 1985. (In Slovak). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

Routine techniques used in the engineering industry are used for the fragmentation of solid radioactive wastes at the V-1 nuclear power plant. So far 13 m^3 of large-size metal waste has been generated in the power plant whose dose rate did not exceed 0.5 mGy/h. Fragmentation was carried out on site, the quantity and dose rate have so far not required any special room or technology or handling equipment for fragmentation. It is being recommended that for future nuclear power plants the project should incorporate special fragmentation rooms, this because extended power plant operation will also increase the amount and degree of contamination of large-size metal wastes. Briefly discussed are the properties of machines and instruments used for fragmentation, and their adjustment meeting the requirements of radiation protection of personnel. (Z.M.).

32552 (INIS-mf—10884, pp 275-279) **Technical and economic evaluation of processes being developed for solid waste processing.** Tittlova, E.; Hladky, E. (Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice, Czechoslovakia). 1985. (In Slovak). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

An analysis was made of the economic benefits of two developed processes for reducing the volume of solid radioactive wastes prior to disposal, namely compacting and incineration. Input data were obtained from the actual production of solid radioactive wastes at the V-1 nuclear power plant, from compacting on site, and the operation of an experimental incineration plant. The two WWER-440 units of the V-1 nuclear power plant generate ca 200 m^3 of wastes per annum (not including air filters and wood) of which 69% is assumed to be incinerable and 27% compactable. The rest is disposed of without prior volume reduction. Disposal costs are assessed at 7500 Czechoslovak crowns per 1 m^3 of wastes, representing a total of 1.5 million crowns per annum. As compared with the disposal of unprocessed wastes the compacting of 95% of wastes generated, reduces the costs of transport and disposal to 25%. With both compacting and incineration, the costs represent 16 to 25% of the initial sum, depending on the ratio of the two processes. The high capital costs of building the incineration plant will thus be offset by the reduction in costs of the radioactive waste disposal. From the technical point of view the analysis did not make a detailed comparison of the properties of the compacted incinerable wastes and ash with regard to stability and leachability of radionuclides. It did also not take into account operating costs and the technological challenge of the two waste volume redution processes. (Z.M.).

32553 (INIS-mf—10884, pp 280-287) **Bituminization of non-radioactive model concentrates at VUCHZ.** Brzobohaty, J.; Kokojan, V.; Stuchlik, S.; Zlamal, J.; Breza, M.; Krejci, F. (Vyzkumny Ustav Chemickych Zarizeni, Brno, Czechoslovakia; Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

Model concentrates of 13 different compositions corresponding to actual radioactive wastes from the V-1 nuclear power plant were used in the experimental operation of the bituminization line at the Research Institute of Chemical Installations in Brno. Silembit S-60 was used as the bituminization emulsion. The objective of the experiments was to test or modify the components of the line and to assess the possibility of using them in the processing of actual

radioactive wastes. On the basis of the said experiments an operating regime was also recommended which meets demands for the safe and reliable operation of the bituminization line in long-term operation. The capacity of the line is 39 kg of wastes per hour, power consumption is 3.4 kWh/kg of product, salt concentration in product reaches 40% and specific weight of product is 1.23 t/m³. It was found that the economy of the bituminization process is significantly affected by costs of the bituminization emulsion. (Z.M.).

32554 (INIS-mf—10884, pp 288-295) **Bituminization of non-radioactive sorbents at VUCHZ.** Brzobohaty, J.; Stuchlik, S.; Seichter, P.; Srnkova, J.; Timulak, J.; Glos, J. (Vyzkumny Ustav Chemickych Zarizeni, Brno, Czechoslovakia; Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

The Research Institute of Chemical Installations in Brno has developed and built equipment for mixing ion exchangers and ash into bitumen and for flushing ion exchangers. For ion exchanger flushing, the minimum rate of transported mixture of ion exchangers and water was determined at 0.3 m/s with volume concentration of ion exchangers in the mixture given at 63-65%. A mixing tank was developed for the bituminization of ion exchangers and ash, and parameters were determined of the working regime with maximum weight concentration of ion exchangers and ash in the product set at 40%. Batching the mixture of water and ion exchangers into a film rotor evaporator was also tested. This technology was found not suitable for the existing design of the evaporator. Efforts therefore concentrated on the bituminization of organic ion exchangers by drying with subsequent mixing with melted bitumen. The process of drying ion exchangers in a fluid or drum drying unit was tested. The residual water content after drying was 3-4% for cation exchangers and 4-5% for anion exchangers. (Z.M.).

32555 (INIS-mf—10884, pp 296-302) **Installation in the A-1 plant of an experimental bituminization line by VUCHZ.** Brzobohaty, J.; Stuchlik, S.; Vocilka, J.; Breza, M.; Hladky, E.; Kubala, J. (Vyzkumny Ustav Chemickych Zarizeni, Brno, Czechoslovakia; Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice, Czechoslovakia; Atomova Elektraren Bohunice, Jaslovske Bohunice, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

Following the termination of the experimental operation of the bituminization line at the Research Institute for Chemical Installations in Brno, the line was dismantled and transferred to the nucler power plant in Jaslovske Bohunice. The installation of the line, the layout of the assemblies are described and the results of tests with non-radioactive simulated wastes and actual radioactive wastes briefly described. An amount of 3.2 m³ of actual radioactive wastes from the V-1 nuclear power plant was processed in the tests. The results confirmed the suitability of bituminization for processing liquid radioactive wastes from WWER nuclear power plants. (Z.M.).

32556 (INIS-mf—10884, pp 303-309) **System for transport and removal of radioactive wastes.** Kucharik, D. (Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice, Czechoslovakia). 1985. (In Slovak). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

A detailed description is given of basic components of the equipment for removing radioactive concentrates from storage tanks in the V-1 nuclear power plant and their transport to the bituminization line. The system was tried in operation with actual radioactive wastes and meets the demands placed on the continuous operation of the bituminization line with regard to the firmly adjustable parameters of the bituminization process. This is achieved by homogenization of the concentrate in the storage tank by means of an in-built system and recirculation, of an own pumping system and of heating the concentrate in a special steam-heated heat exchanger. Transport containers are filled using a remote controlled filling head which is suspended on a rotary arm whose rotation as well as the application of the head to the container are provided with a pneumatic cylinder. A similar device serves the remote controlled emptying of containers. PC-55 containers mounted on trucks are used for transporting radioactive wastes to the bituminization line. The 55 mm thick shielding of containers ensures that the maximum exposure rate is 5 mR/h at a distance of 2 metres from the containers. (Z.M.).

32557 (INIS-mf—10884, pp 310-323) **Development of non-standard equipment of bituminization line.** Vlasak, L.; Zlamal, J.; Brzobohaty, J.; Havlik, J. (Vyzkumny Ustav Chemickych Zarizeni, Brno, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

A brief description is presented of some components of the bituminization line developed at the Research Institute of Chemical Installations in Brno. The film rotor evaporator has an evaporation area of 2 m/sup 2/. The mixing tank is the main technological assembly for processing loose materials, i.e., sorbents and fly ash which it mixes with melted bitumen. The screw conveyor with a three-way valve is designed for batching the dried radioactive sorbent and fly ash into mixing tanks. Attention is also devoted to certain systems of measurement and control of the bituminization line, namely to measurement of the level of the bituminization product, the flow rate of bituminization emulsion and the water-sorbent mixture and to the diagnostics of failure and accident conditions of the film rotor evaporator. (Z.M.).

32558 (INIS-mf—10884, pp 374-376) **Computer program System variability.** Kucera, L. (Karlova Univ., Prague, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

The program is described which is aimed at determining and analyzing all technologically permissible configurations of the system for treating radioactive wastes from nuclear power plants. The program is based on a range of so-called unit operations which are represented, e.g., by the evaporator, bituminization, cementation, etc. Each unit operation is characterized by the number of inputs and outputs described by vectors whose dimension is fixed and may be up to 50, by conditions of applicability and by transform rules. The configuration is conceived as a system of unit operations together with a description of their interconnection. The current version of the program written in Fortran IV only produces non-cyclic configurations but a version is being prepared which will include the recycling of certain intermediate products. (Z.M.).

32559 (INIS-mf—10884, pp 377-381) **Modeling of unit operations.** Sumberova, V.; Holy, J.; Halova, J. (Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

Mathematical models were constructed of twenty unit operations, i.e., technological operations which are applicable in the process of radioactive waste processing. The models were used in computer program System variability whose aim it is to determine all technologically permissible configurations of the system for treating radioactive wastes from nuclear power plants. The models are based on the results of the work of Czechoslovak research institutes as well as on experimental data taken over from foreign literature. The set of mathematical models includes the concentration of

liquid radioactive wastes comprising, e.g., sedimentation, temporary storage and evaporation, the processing of solid radioactive wastes (sorting, compacting, incineration), the solidification of concentrated liquid radioactive wastes (cementation, bituminization), and end operations, such as discharge into rivers or disposal at a disposal site. The properties of the models are discussed as are the possibilities of extending them and increasing their precision. (Z.M.).

32560 (INIS-mf—10884, pp 382-387) **Modeling of radioactive waste transfer from solidification line.** Kindler, E.; Ruzicka, F. (Karlova Univ., Prague, Czechoslovakia; Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

The transfer of radioactive wastes from the solidification line was modeled using the so-called subject-oriented programming and the SIMULA 67 language. All systems are assumed to exist in fixed cycles of work weeks, days and shifts and the amount of transported radioactive wastes is assumed to be evenly distributed in every work shift. The model also considers the effects of personnel irradiation. In routine handling a certain level of irradiation is taken into account and it is assumed with a certain probability that an accident may occur during which there will be a certain exposure of personnel and that the work process will have to be interrupted for a certain period of time. Briefly discussed are the properties of the model and the results of the comparison of two considered technical variants of the transfer of radioactive wastes, namely the use of a roller conveyer and of high-lift trucks. The latter variant appears to be more suitable and shows better parameters in all except irradiation during non-accident handling. (Z.M.).

32561 (INIS-mf—10884, pp 388-396) **Problems of economic evaluation of technological variants of handling radioactive wastes from nuclear power plants.** Janout, J. (Vysoka Skola Ekonomicka, Prague, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

The system is analyzed of the economic evaluation of radioactive waste disposal technologies. The system has a hierarchical structure in which criteria are mixed of higher and lower order expressing different part/whole relationships (the subsystem and the suprasystem) while having an iterative character. The basic criterion of economic efficacy is the criterion of minimal cost for the disposal of radioactive wastes relative to unit power generated by the respective power plants. Also studied is the effect of structural arrangement of the technology of radioactive waste disposal on its total efficacy and the questions are discussed of alternative substitutions of partial technological variants. The correct determination of the content and extent of costs which are the object of the evaluation and their economic expression, has primary importance for the optimal choice of variant of radioactive waste disposal technology. (Z.M.).

32562 (INIS-mf—10884, pp 397-402) **Selection criteria of procedures for treating radioactive wastes from nuclear power plants.** Halova, J.; Glueckaufova, D.; Kunclova, V. (Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia; Ceskoslovenska Akademie Ved, Prague; Karlova Univ., Prague, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

Criteria have been specified for the selection of the optimal technology of the disposal of radioactive wastes from nuclear power plants, based on literature searches from the INIS system. The relative weights of 11 criteria were determined on the basis of comparison of pairs carried out by 10 specialists of the Institute of Nuclear Research. The following criteria were considered the most significant: Product quality, Technology reliability and Availability of technology. The criteria were applied in a complex evaluation of bituminization and cementation of radioactive concentrates. They will serve the interactive evaluation of variants in a complex systems analysis of nuclear power plant radioactive waste disposal technologies. In a dialogue between the technologist and the computer, the computer will provide the required information for evaluation and the specialist will then rank the variants according to the different criteria. (Z.M.).

32563 (INIS-mf—10884, pp 403-413) **Complex approach to analyzing technological variants of radioactive waste treatment.** Glueckaufova, D.; Halova, J.; Marek, J. (Ceskoslovenska Akademie Ved, Prague; Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia; Ceske Energeticke Zavody, Prague, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

Certain questions related to the use of methods of complex multicriterial evaluation in nuclear power engineering are discussed. 11 criteria were selected for the analysis of technological variants of radioactive waste treatment. An analysis was made of the important criterion Product quality which was divided into 18 partial characteristics which were ranked according to significance. Saaty's method was used to calculate their relative weight. The analysis showed that chemical durability of the product has the greatest weight followed by leachability, chemical composition and compatibility of waste and matrix, resistance to water, etc. The results are tabulated. (Z.M.).

32564 (INIS-mf—10884, pp 414-425) **Design of technological solidification experiment under dynamic conditions.** Halova, J. (Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

A controlled technological experiment was designed for the solidification of radioactive wastes from nuclear power plants under dynamic conditions. The experiment is designed such as to provide maximum data on solidification installations using minimum time and thereby also minimum power and chemicals. The method of pulse response was used to measure the dynamics of a calciner and a glass furnace. The knowledge of these continuous-mode facilities allowed to calculate the time needed for establishing steady state at their outlet following a step change of concentrations at their inlet. This is the important and only available information on the establishment of a stable composition of the product following a change in the composition of the treated wastes because analyses of the solidification product are time demanding and can only be made after the experiment. (Z.M.).

32565 (INIS-mf—10884, pp 426-433) **Physical and chemical problems of radioactive waste processing.** Jedinakova, V.; Bartikova, O.; Zilkova, J.; Hejda, J.; Kyrsova, V.; Kutek, F.; Dusek, B.; Nebovidsky, J.; Klimesova, V. (Vysoka Skola Chemicko-Technologicka, Prague, Czechoslovakia; Vysoka Skola Chemicko-Technologicka, Prague, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

The reduction in concentration was studied of soluble borates from radioactive wastes brought about by the precipitation of boric acid with cobalt(II) and iron(III) nitrates. Precipitation was carried out at various concentrations of boric acid, the precipitation agent and various solution pH. It was found that in the precipitation of soluble borates with Co(II) and Fe(III) ions, quantitative coprecipitation occurs of the radioactive cobalt, iron and strontium. The process may be described as isomorphic precipitation. Also investigated was the possible application of aliphatic alcohols and

diols in selective extraction of boric acid from radioactive wastes. N-octanol and 2-ethyl hexanol appear to be suitable for practical use. The mechanism was studied of the extraction of boric acid and the synergic effect of anions on extraction with aliphatic diols. The association was evaluated of alcohols and their esters of boric acid, and a mathematical model was constructed for the evaluation of association constants from osmometric data. Also investigated was the suitability of inorganic sorbents and polymers for the fixation of radioactive wastes. It is concluded that water glass is none too suitable as the basic binding material because there is high leachability of soluble substances from polymer products. (Z.M.).

32566 (INIS-mf—10884, pp 437-453) **Pilot plant for experimental bituminization line PS 44 EBO.** Riha, K. (Kralovopolska Strojirna, Brno, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

The modifications are described made in the design of major components of the pilot plant experimental bituminization line involving: the mixing equipment, the film rotor evaporator, the calciner, and various transport mechanisms for handling drums and containers. The difficulty and complexity of the problem which Kralovopolska strojirna Brno, the end supplier of the bituminization line, will have to tackle is evident mainly from the case of bridge cranes, which feed the line, and the full-portal gantry crane which handles the containers and drums at regional sites of radioactive waste disposal. (Z.M.).

32567 (INIS-mf—10884, pp 265-274) **Storage, processing and disposal of radioactive wastes from nuclear power plants.** Tittlova, E.; Hladky, E. (Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice, Czechoslovakia). 1985. (In Slovak). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

The conception of the disposal of solid radioactive wastes from nuclear power plants in Czechoslovakia follows three main objectives: minimization of the amount of generated wastes, reasonably attainable reduction of the volume of generated wastes, and attainment of such parameters of radioactive wastes which would allow their safe and permanent disposal in regional disposal sites. The aspects are discussed of the fulfilment of the said objectives with regard to radioactive wastes generated by the V-1 nuclear power plant, namely the sorting, fragmentation, packing and intermediate storage of solid wastes. Compacting and incineration are considered for reducing the volume of solid radioactive wastes. A low-pressure press is already being operated and an experimental incineration plant is being built. It is recommended that radioactive wastes should be transported from the nuclear power plant by organizations responsible for deposition in the regional disposal site. This would reduce transport and handling equipment. The necessity is underlined of finishing projects of nuclear power plants such that they would incorporate all demands on future processing of solid radioactive wastes. (Z.M.).

32568 (INIS-mf—10884, pp 341-349) **Safety aspects of radioactive waste disposal.** Dlouhy, Z. (Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

The effective and safe isolation of radioactive wastes is given by the perfect implementation of the whole deposition system which is affected mainly by three factors: siting, construction of the disposal site and quality of the wastes. A brief characteristic is given of the first two factors and attention is mainly devoted to the safety analysis of the third. A survey is given of criteria to be applied to the quality of wastes to be deposited. A survey is given of exposures ensuing from possible failures on site. Safety analyses show that the gradual loss of integrity of all artificial barriers is the maximum credible design basis accident. Briefly discussed are the aims and achieved results of the research oriented to the mathematical modelling of the transport of radionuclides in the environment. (Z.M.).

32569 (INIS-mf—10884, pp 434-436) **Designer's participation in State contract A 01-159-104.** Lastovicka, Z. (Energoprojekt, Prague, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

A survey is presented of research on The treatment of radioactive wastes from the operation of nuclear power installations with light water reactors carried out in the years 1982 - 1985 by researchers of Czechoslovak project design organizations within the state plan of the development of science and technology. Also listed are studies which will still be made within the project. The purpose of involving the project designer in such research is emphasized. (Z.M.).

32570 (NAGRA-NTB—85-19) **Organic complexing agents in low and medium level radioactive waste.** Allard, B.; Persson, G. (Nationale Genossenschaft fuer die Lagerung Radioaktiver Abfaelle (NAGRA), Baden (Switzerland)). Nov 1985. 64p. Nagra, CH-5401 Baden, Switzerland.

Low and medium level radioactive wastes will contain various organic agents, such as ion exchange resins (mainly in the operational wastes), plastics and cellulose (mainly in the reprocessing wastes and in the decommissioning wastes) and bitumen (mainly in the reprocessing wastes). The degradation of these organics will lead to the formation of complexing agents that possibly could affect the release of radionuclides from an underground repository and the subsequent transport of these nuclides. The solution chemistry of the actinides may be totally dominated by the presence of such organic degradation products within the repository. However, hydrolysis and formation of carbonates (and possibly humates) will most likely dominate solubility and speciation outside the immediate vicinity of the repository. The minor quantities of strong complexing agents (in the reprocessing waste), notably aminopolycarboxylic acids (EDTA, DTPA) and possibly organic phosphates (DBP) could significantly affect speciation and sorption behaviour of primarily the trivalent actinides even outside the repository.

32571 (NAGRA-NTB—85-49) **Sampling and chemical analysis of groundwaters from the exploratory boreholes. Exploratory boreholes Boettstein, Weiach, Riniken, Schafisheim, Kaisten, Leuggern.** Wittwer, C. (Nationale Genossenschaft fuer die Lagerung Radioaktiver Abfaelle (NAGRA), Baden (Switzerland)). Oct 1986. 206p. (In German). Nagra, CH-5401 Baden, Switzerland.

As a part of the Nagra geological investigation programme in northern Switzerland, numerous water samples were taken in the Boettstein, Weiach, Riniken, Schafisheim, Kaisten and Leuggern boreholes to obtain information on the chemistry and residence times of deep groundwaters. This report contains a compilation of hydrochemical data, comments on the individual water sampling actions and an evaluation of sample quality with respect to admixing of drilling fluids. The samples were taken from separate test intervals in the sediments and the crystalline rock. After removal of various types of drilling fluids such as mud as well as fresh water or deionised water during a cleaning phase, the samples were taken at the surface or at depth using pressure vessels. The tracers added to the drilling fluids (uranine, m-TFMBA) as well as the tritium content were used for a quantiative estimation of the content of drilling fluid in the samples (contamination). With a view fo further geochemical modelling, the samples were assessed with reference to the effect of contamination on the results of the chemical analyses. A total of 68 water samples were taken from 53 different intervals: - 27 samples had problem-free cleaning phases and were taken with negligible contamination. - 23 samples were taken under difficult conditions. Problems with hydraulic communication around packers, uncertain origin, inaccuracy as to extent of contamination, presence of cement, possible traces of salt from drilling fluid etc. meant that the analyses could only be used with extreme caution or after

additional data-processing. - The analysis results from 18 samples will be disregarded due to significant drilling fluid content or because more reliable data are available for the same test interval.

32572 **(NUREG/CR—4655) Unsaturated flow and transport through fractured rock related to high-level waste repositories: Final report, Phase 2.** Rasmussen, T.C.; Evans, D.D. (comps.). (Arizona Univ., Tucson (USA). Dept. of Hydrology and Water Resources; Nuclear Regulatory Commission, Washington, DC (USA). Div. of Engineering). May 1987. 500p. NTIS, PC A21/MF A01 - GPO. File Number TI87900734.

In response to high-level radioactive waste repository licensing needs of the US Nuclear Regulatory Commission, this report examines and provides insights into physical characteristics and methodologies for performance assessment of candidate sites in unsaturated fractured rock. The focus is on the ability of the geologic medium surrounding an underground repository to isolate radionuclides from the accessible environment. Media of interest are consolidated rocks with variable fracturing, rock matrix permeabilities, contained water under negative pressure, and air-filled voids. Temperature gradients are also of interest. Studies present conceptual and theoretical considerations, physical and geochemical characterization, computer modeling techniques, and parameter estimation procedures. Radionuclide transport pathways are as solutes in groundwater and as vapor through air-filled voids. The latter may be important near a heat source. Water flow and solute transport properties of a rock matrix may be quantified using rock core analyses. Natural spatial variation dictates many samples. Observed fractures can be characterized and combined to form a fracture network for hydraulic and transport assessments. Unresolved problems include the relation of network hydraulic conductivity to fluid pressure and to scale. Once characterized, the matrix and fracture network can be coupled. Reliable performance assessment requires additional studies. 302 refs., 163 figs., 36 tabs.

32573 **(NUREG/CR—4918-Vol.1) Control of water infiltration into near surface LLW [low level waste] disposal units: Annual report, October 1985-September 1986.** Schulz, R.K.; Ridky, R.W.; O'Donnell, E. (California Univ., Berkeley (USA). Dept. of Plant and Soil Biology; Nuclear Regulatory Commission, Washington, DC (USA). Div. of Engineering). Apr 1987. 27p. NTIS, PC A03/MF A01 - GPO. File Number TI87900644.

In the humid eastern part of the United States, trench covers have, in general, failed to prevent some of the incident precipitation from percolating downward to buried wastes. It is the purpose of the present work to investigate and demonstrate a procedure or technique that will control water infiltration to buried wastes regardless of above or below ground disposal. Results to date show the proposed procedure to be very promising and are applicable to shallow land burial as well as above ground disposal (e.g., Tumulus). In essence, the technique combines engineered or positive control of run-off, along with a vegetative cover, and is named "bioengineering management". To investigate control of infiltration, lysimeters are being used to make complete water balance measurements. The studies have been underway at the Maxey Flats, Kentucky, low-level waste disposal facility for the past three seasonal years. When the original Maxey Flats site closure procedure is followed, it is necessary to pump large amounts of water out of the lysimeters to prevent the water table from rising closer than 2 meters from the surface. Using the bioengineering management procedure, no pumping is required. As a result of the encouraging initial findings in the rather small-scale lysimeters at Maxey Flats, a large-scale facility for demonstration of the bioengineering management technique has been constructed at Beltsville, Maryland. This facility is now operational with the demonstration and data collection underway. 6 refs., 15 figs.

32574 **(ORNL/Sub—85-97368/3) Monitoring plan for characterization of the Building 3019 leak site.** (Geraghty and Miller, Inc., Oak Ridge, TN (USA)). Jun 1986. Contract AC05-84OR21400. 40p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87002965.

The Oak Ridge National Laboratory (ORNL) has established a Remedial Action Program to provide comprehensive management of areas where past research, development, and waste management activities have resulted in residual contamination of facilities or the environment. In the winter of 1985, elevated levels of strontium-90 were detected in White Oak Creek and the ORNL sewage treatment plant. A leak was subsequently identified in a low-level waste transfer line north of Building 3019. The period of leakage and the exact chemical composition of the effluent are unknown. Two dye tests conducted at the leak site have identified several possible pathways for contaminant migration. The discovery of a solution cavity in the Chickamauga bedrock underlying the leak site and the rapid appearance of dye in the sump at Building 3042 indicate the extension of the cavity system along strike to the east. This report outlines the available published and unpublished background information pertaining to the site and proposes a monitoring plan consisting of soil sample collection and monitor well installation to provide a preliminary assessment of the types and extent of contamination at the leak site. The plan is also designed to provide additional geologic and hydrologic data for evaluating possible contaminant migration pathways. 6 refs., 10 figs., 1 tab.

32575 **(SAND—85-1580) Cost comparison of horizontal and vertical waste emplacement methods for a repository in tuff.** Stinebaugh, R.E.; Robb, R.M. (Sandia National Labs., Albuquerque, NM (USA); Los Alamos Technical Associates, Inc., NM (USA)). May 1987. Contract AC04-76DP00789. 48p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87010521.

Two methods have been proposed for waste emplacement at the Yucca Mountain repository. The first, and reference, method uses vertical holes drilled into the floor of the emplacement drifts. These holes are 25 ft deep and 29 in. in diameter. The alternate method uses horizontal holes, drilled into the emplacement drift wall, that are up to 700 ft long and 33 in. in diameter. This document shows that (1) there are important cost savings resulting from the use of the horizontal emplacement method and (2) these cost advantages exist for horizontal hole lengths as short as 100 ft. The potential, significant savings through the use of horizontal emplacement are obvious from the results of this study. It should be noted that in this study the last waste package in the borehole is placed 32 ft in from the wall of the emplacement drift for all holes (this dimension is referred to as standoff). It is assumed that this 32-ft standoff is satisfactory and that access for maintenance or retrieval can be made possible by blast cooling of emplacement drifts. The major cost differential in horizontal drilling occurs in the transition from 100- to 200-ft holes. This change offers a cost reduction of 29.4%, or $4,285 per container. By comparison, the incremental difference between 200-ft and 700-ft holes is $3,364 per container. The costs shown in this report are the direct operating and capital recovery costs associated with drilling and lining the holes, as well as the appropriate mining costs. The costs of the container, waste transportation to the emplacement hole, and operating and depreciation costs for the surface facility are not included since these costs are fixed regardless of the emplacement method. 6 refs., 8 figs., 18 tabs.

32576 **(SAND—86-2302) The Subseabed Disposal Project institutional program activities, October 1982 through September 1984.** Bertram, S.G. (Sandia National Labs., Albuquerque, NM (USA)). Mar 1987. Contract AC04-76DP00789. 280p. NTIS, PC A13/MF A01; 1; GPO Dep. File Number DE87008894.

This report covers the FY82 to FY84 institutional activities of the Subseabed Disposal Project. An introduction and a general description of each activity is included. Detailed descriptions are contained in the appendices. 13 refs.

32577 **(SAND—86-2674) Compilation of selected marine radioecological data for the US Subseabed Program: Summaries of available radioecological concentration factors and biological half-lives.** Gomez, L.S.; Marietta, M.G.; Jackson, D.W. (Sandia National Labs., Albuquerque, NM (USA)). Apr 1987. Contract AC04-76DP00789. 288p. NTIS, PC A13/MF A01; 1; GPO Dep. File Number DE87008890.

The US Subseabed Disposal Program has compiled an extensive concentration factor and biological half-life data base from the

international marine radioecological literature. A microcomputer-based data management system has been implemented to provide statistical and graphic summaries of these data. The data base is constructed in a manner which allows subsets to be sorted using a number of interstudy variables such as organism category, tissue/organ category, geographic location (for in situ studies), and several laboratory-related conditions (e.g., exposure time and exposure concentration). This report updates earlier reviews and provides summaries of the tabulated data. In addition to the concentration factor/biological half-life data base, we provide an outline of other published marine radioecological works. Our goal is to present these data in a form that enables those concerned with predictive assessment of radiation dose in the marine environment to make a more judicious selection of data for a given application. 555 refs., 19 figs., 7 tabs.

32578 **(SAND—87-0132C) Finite element analysis of heat transport in a hydrothermal zone.** Bixler, N.E.; Carrigan, C.R. (Sandia National Labs., Albuquerque, NM (USA)). 1987. Contract AC04-76DP00789. 12p. (CONF-8706110—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009298.

From 5. international conference on numerical methods for thermal problems; Montreal, Canada (29 Jun 1987).

Two-phase heat transport in the vicinity of a heated, subsurface zone is important for evaluation of nuclear waste repository design and estimation of geothermal energy recovery, as well as prediction of magma solidification rates. Finite element analyses of steady, two-phase, heat and mass transport have been performed to determine the relative importance of conduction and convection in a permeable medium adjacent to a hot, impermeable, vertical surface. The model includes the effects of liquid flow due to capillarity and buoyancy and vapor flow due to pressure gradients. Change of phase, with its associated latent heat effects, is also modeled. The mechanism of capillarity allows for the presence of two-phase zones, where both liquid and vapor can coexist, which has not been considered in previous investigations. The numerical method employs the standard Galerkin/finite element method, using eight-node, subparametric or isoparametric quadrilateral elements. In order to handle the extreme nonlinearities inherent in two-phase, nonisothermal, porous-flow problems, steady-state results are computed by integrating transients out to a long time (a method that is highly robust).

32579 **(UCRL—95568) Test concept for waste package environment tests at Yucca Mountain.** Yow, J.L. Jr. (Lawrence Livermore National Lab., CA (USA)). Jun 1987. Contract W-7405-ENG-48. 8p. (CONF-870625—14). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010273.

From Rock mechanics meeting; Tucson, AZ, USA (29 Jun 1987).

The Nevada Nuclear Waste Storage Investigations Project is characterizing a tuffaceous rock unit at Yucca Mountain, Nevada to evaluate its suitability for a repository for high level radioactive waste. The candidate repository horizon is a welded, devitrified tuff bed located at a depth of about 300 m in the unsaturated zone, over 100 m above the water table. As part of the project, Lawrence Livermore National Laboratory is responsible for designing the waste packages and for assessing their expected performance in the repository environment. The primary region of interest to package design and performance assessment is the portion of the rock mass within a few meters of waste emplacement holes. Hydrologic mechanisms active in this unsaturated near-field environment, along with thermal and mechanical phenomena that influence the hydrology, need to be understood well enough to confirm the basis of the waste package designs and performance assessment. Large scale in situ tests (called waste package environment tests) are being planned in order to develop this understanding and to provide data sets for performance assessment model validation (Yow, 1985). Exploratory shafts and limited underground facilities for in-situ testing will be constructed at Yucca Mountain during site characterization. Multiple waste package environment tests are being planned for these facilities to represent horizontal and vertical waste emplacement configurations in the repository target horizon. These approximately half-scale tests are being designed to investigate rock mass hydrologic conditions during a cycle of thermal loading.

32580 **(UNI—2898-Rev.0) Decommissioning conceptual study: In situ decommissioning of eight 105 reactor buildings in the 100 areas.** Griffin, P.W. (Kaiser Engineers Hanford Co., Richland, WA (USA)). Mar 1987. Contract AC06-87RL10900. 204p. NTIS, PC A10/MF A01; 1; GPO Dep. File Number DE87008393.

Eight deactivated production reactors on the Hanford Site will be decommissioned. This decommissioning conceptual study report is based on performing the decommissioning with the recommended preferred method (in situ). Final selection of the method of decommissioning is dependent upon the completion of the national Environmental Policy Act (NEPA) process. For the purpose of estimating this effort, it is assumed that the work will be done as follows: UNC Nuclear Industries Decommissioning Operations will do the radiological characterization, all Decontamination and Decommissioning nonexplosive destruction, fixing of contaminants, and void filling; an offsite explosives contractor will assist in destruction of some concrete walls; and a large scale earth-moving contractor will construct the burial mound. Before demolition, loose contamination will be stabilized. Building walls and ceilings will be safely and cost effectively demolished using a wrecking ball and/or explosives. Most of the reinforced concrete walls that will reside within the berm envelope will be retained. The rubble will be spread and left as fill. After demolition and void filling is completed, an offsite contractor will mound over the entire building with earth and gravel to extend a minimum of 16 ft above the reactor block. The mound will be seeded to establish plant growth which will minimize run-off erosion, and promote transpiration of precipitation. The depth of the mound will be sufficient so that precipitation penetration will be negligible thereby reducing the potential for radionuclide transport down into the water table. The total estimated cost of this project, including escalation, contingency, and engineering, is $42,760,000, and is estimated to take 5 years to complete. The project funding is scheduled to commence with capital equipment procurement and design in the first quarter of FY 1987.

0530 Environmental Aspects

REFER ALSO TO CITATION(S) 32509, 32572, 33718, 33720, 33725

32581 **(CONF-870601—10) Point kernel versus radiation transport for iron deep penetration problems.** Broadhead, B.L.; Parks, C.V. (Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 6p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87005720.

From Annual meeting of the American Nuclear Society; Dallas, TX, USA (7 Jun 1987).

The purpose of this study was to determine the relative merits and adequacy of the QAD-CG and QAD-CGGP point kernel codes for spent fuel shielding problems by comparing gamma dose results with those of several radiation transport codes - DOT IV, MORSE-SGC, XSDRNPM-S, and MCNP. An intercomparison of results from the radiation transport codes was also of secondary interest. The problem considered was an R-Z spent fuel cask model consisting of a homogenized source region (UO_2 fuel + basket) surrounded by a 38 cm thick cast iron body. The total cask height is 530 cm. Photon source strengths for eight different discrete energy lines (0.6 to 2.8 MeV) were specified. 8 refs., 1 tab.

32582 **(DOE/ID—10164-Vol.1) Environmental considerations associated with siting, constructing, and operating a special isotope separation plant at INEL: Volume 1, Proceedings: Report of public hearings.** (Idaho National Engineering Lab., Idaho Falls (USA)). Mar 1987. 165p. (CONF-870291—Vol.1). NTIS, PC A08/MF A01; 1; GPO Dep. File Number DE87009727.

From Environmental considerations associated with siting, constructing, and operating a special isotope separation plant at INEL; Idaho Falls, ID, USA (24 Feb 1987).

This report documents the two public hearings conducted for the purpose of determining the scope of issues to be addressed in relation to the siting, constructing, and operating of a special isotope separation plant at INEL. The report includes transcripts of the public hearings held in Idaho Falls, Idaho, February 24, 1987,

and in Boise, Idaho, February 26, 1987, and includes the exhibits of records relating to those hearings. The review and hearing process meets pertinent National Environmental Policy Act (NEPA) requirements, Council on Environmental Quality (CEQ) regulations, and DOE guidelines.

32583 **(DOE/ID—10164-Vol.2) Environmental considerations associated with siting, constructing, and operating a special isotope separation plant at INEL: Volume 2, Proceedings: Report of public hearings.** (Idaho National Engineering Lab., Idaho Falls (USA)). Mar 1987. 364p. (CONF-870291—Vol.2). NTIS MF A01; 2; GPO Dep. File Number DE87009728.

From Environmental considerations associated with siting, constructing, and operating a special isotope separation plant at INEL; Idaho Falls, ID, USA (24 Feb 1987).

This report documents the two public hearings conducted for the purpose of determining the scope of issues to be addressed in relation to the siting, constructing, and operating of a special isotope separation plant at INEL. The report includes transcripts of the public hearings held in Idaho Falls, Idaho, February 24, 1987, and in Boise, Idaho, February 26, 1987, and includes the exhibits of record relating to those hearings. The review and hearing process meets pertinent National Environmental Policy Act (NEPA) requirements, Council on Environmental Quality (CEQ) regulations, and DOE guidelines.

32584 **(MLM—3427) Environmental monitoring at Mound: 1986 report.** Carfagno, D.G.; Farmer, B.M. (Monsanto Research Corp., Miamisburg, OH (USA). Mound). 11 May 1987. Contract AC04-76DP00053. 46p. NTIS, PC A03/MF A01; GPO Dep. File Number DE87010563.

The local environment around Mound was monitored for tritium and plutonium-238. The results are reported for 1986. Environmental media analyzed included air, water, vegetation, foodstuffs, and sediment. The average concentrations of plutonium-238 and tritium were within the DOE interim air and water Derived Concentration Guides (DCG) for these radionuclides. The average incremental concentrations of plutonium-238 and tritium oxide in air measured at all offsite locations during 1986 were 0.03% and 0.01%, respectively, of the DOE DCGs for uncontrolled areas. The average incremental concentration of plutonium-238 measured at all locations in the Great Miami River during 1986 was 0.0005% of the DOE DCG. The average incremental concentration of tritium measured at all locations in the Great Miami River during 1986 was 0.005% of the DOE DCG. The average incremental concentrations of plutonium-238 found during 1986 in surface and area drinking water were less than 0.00006% of the DOE DCG. The average incremental concentration of tritium in surface water was less than 0.005% of the DOE DCG. All tritium in drinking water data is compared to the US EPA Drinking Water Standard. The average concentrations in local private and municipal drinking water systems were less than 25% and 1.5%, respectively. Although no DOE DCG is available for foodstuffs, the average concentrations are a small fraction of the water DCG (0.04%). The concentrations of sediment samples obtained at offsite surface water sampling locations were extremely low and therefore represent no adverse impact to the environment. The dose equivalent estimates for the average air, water, and foodstuff concentrations indicate that the levels are within 1% of the DOE standard of 100 mrem. None of these exceptions, however, had an adverse impact on the water quality of the Great Miami River or caused the river to exceed Ohio Stream Standards. 20 refs., 5 figs., 31 tabs.

0540 Health And Safety

REFER ALSO TO CITATION(S) 32508, 32511, 32519, 32520, 32527, 32894, 32895, 32898, 32901, 32902, 32903, 32904, 32910, 32913, 32917, 32918, 32919, 32920, 32921, 32926, 32927, 32928, 32929, 32931, 32934, 32938, 32939, 32941, 33011, 33669, 33671, 33672, 33673, 33717, 33751

32585 (CONF-860932—, pp 241-246) **Accident analysis codes that predict the transport of radiological aerosol through a fuel cycle facility as a result of an accident.** Greenaugh, K.C. (National Bureau of Standards, Gaithersburg, MD). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

Computer codes are presently being developed which predict the gas-dynamics, material transport, and heat-transfer induced from fire, tornado and explosion accidents in nuclear fuel cycle facilities. These codes consist of models which describe the major phenomena which occur to 0.5 to 5.0 micron particles as they are released in a room, and transported by way of the ventilation system throughout the nuclear fuel cycle facility.

32586 (CONF-860932—, pp 259-264) **Restoration of a radiologically contaminated site: SAGEBRUSH IV.** Tawil, J.J. (Pacific Northwest Lab., Richland, WA). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

This paper describes the development of a site restoration plan for the SAGEBRUSH IV exercise held in northeastern Washington state in mid-August, 1986. DECON, a computer program developed by Pacific Northwest Laboratory, was used to produce information around which the site restoration plan was developed. The features of DECON that are demonstrated in this paper indicate its potential usefulness as a planning tool for site restoration. Strategies that are analyzed with DECON include: 1) prohibiting specific operations on selected surfaces; 2) requiring that specific methods be used on selected surfaces; 3) evaluating the trade-off between cleanup standards and decontamination costs; 4) evaluating the sensitivity of the results to various assumptions; and 5) varying cleanup standards according to expected human exposure to the surface.

32587 **(DOE/OR/20722—148) Maywood Interim Storage Site: Annual site environmental report, Maywood, New Jersey, Calendar year 1986: Formerly Utilized Sites Remedial Action Program.** (Bechtel National, Inc., Oak Ridge, TN (USA)). Jun 1987. Contract AC05-81OR20722. 76p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE87010151.

During 1986, the environmental monitoring program was continued at the Maywood Interim Storage Site (MISS), a US Department of Energy (DOE) facility located in the Borough of Maywood and the Township of Rochelle Park, New Jersey. The MISS is presently used for the storage of low-level radioactively contaminated soils. The MISS is part of the Formerly Utilized Sites Remedial Action Program (FUSRAP). As part of the decontamination research and development project authorized by Congress under the 1984 Energy and Water Appropriations Act, remedial action and environmental monitoring programs are being conducted at this site and at vicinity properties by Bechtel National, Inc., Project Management Contractor for FUSRAP. The monitoring program at the MISS measures thoron and radon gas concentrations in air; external gamma radiation levels; and thorium, uranium, and radium concentrations in surface water, groundwater, and sediment. To verify that the site is in compliance with the DOE radiation protection standard (100 mrem/y) and to assess the potential effect on public health, the radiation dose was calculated for the maximally exposed individual. Based on the conservative scenario described in the report, the maximally exposed individual would receive an annual external exposure approximately equivalent to 1% of the DOE radiation protection standard of 100 mrem/y. This exposure is less than the exposure a person would receive during a round-trip flight from New York to Los Angeles (due to greater amounts of cosmic radiation at higher altitudes). The cumulative dose to the population within an 80-km (50-mi) radius of the MISS that would result from radioactive materials present at the site would be indistinguishable from the dose the same population would receive from naturally occurring radioactive sources. Results of the 1986 monitoring show that the MISS is in compliance with the DOE radiation protection standard. 16 refs., 8 figs., 15 tabs.

32588 **(DOE/OR/20722—149) Middlesex Sampling Plant and Middlesex Municipal Landfill annual site environmental report, Middlesex, New Jersey: Calendar year 1986.** (Bechtel National, Inc., Oak Ridge, TN (USA)). May 1987. Contract AC05-81OR20722. 88p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE87009653.

During 1986, the environmental monitoring program was continued at the former Middlesex Sampling Plant (MSP) and former Middlesex Municipal Landfill (MML) sites, located in the Borough of Middlesex, New Jersey. The MSP and MML sites are part of the Formerly Utilized Sites Remedial Action Program (FUSRAP), a DOE program to decontaminate or otherwise control sites where residential radioactive materials remain from either the early years of the nation's atomic energy program or commercial operations causing conditions that Congress has mandated DOE to remedy. The monitoring program at the MSP and MML measures radon gas concentrations in air; external gamma radiation levels; and uranium and radium concentrations in surface water, groundwater, and sediment. To verify that sites are in compliance with the DOE radiation protection standard (100 mrem/yr) and to assess their potential effect on public health, the radiation dose was calculated for the maximally exposed individual. Based on the conservative scenarios described in the report, this individual, at the MSP, would receive an annual external exposure approximately equivalent to 10 percent of the DOE radiation protection standard. By comparison, the incremental dose received from living in a brick house versus a wooden house is about the same. At the MML, the annual external exposure to the maximally exposed individual would be less than 1% of the standard. The cumulative dose to the population within an 80-km (50-mi) radius of the sites that would result from radioactive materials present at the MSP and MML would be indistinguishable from the dose that the same population would receive from naturally occurring radioactive sources. Results of the 1986 monitoring show that the MSP and MML are in compliance with the DOE radiation protection standard. 14 refs., 13 figs., 23 tabs.

32589 **(SAND—84-2275) Worker radiation doses during vertical emplacement and retrieval of spent fuel at the tuff repository.** Stinebaugh, R.E.; Frostenson, J.C. (Sandia National Labs., Albuquerque, NM (USA); Los Alamos Technical Associates, Inc., NM (USA)). Feb 1987. 57p. NTIS, PC A04/MF A01. File Number DE87009349.

One of the principal objectives of the Nevada Nuclear Waste Storage Investigations (NNWSI) Project is the development of conceptual designs of the equipment and facilities that will be required at the tuff repository for high level radioactive waste. This report has been prepared for use by the repository designers in the conceptual design of waste-handling facilities and equipment for vertical emplacement. Emplacement and retrieval operations and the estimated worker radiation doses are listed. All annual doses are below the 5-rem permissible dose-equivalent limit. One crew member designation exceeds the design objective of 1 rem. These worker doses will be reduced in future design phases by increasing shielding on the equipment at the facility. 9 refs., 4 figs., 23 tabs.

0550 Safeguards, Inspection, And Accountability

REFER ALSO TO CITATION(S) 32516, 33031

32590 **(IAEA-RL—138) Qualification of glass bottles for accurate control of the composition of uranium dioxide powder samples.** Zoigner, A.; Berger, J.; Aigner, H.; Bagliano, G. (International Atomic Energy Agency, Seibersdorf (Austria). Laboratories). Apr 1986. 20p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702280.

An earlier report demonstrated the precautions which must be taken to prevent or control the potential changes in the composition of small analytical samples of 10-20 g of UO_3 powders because of moisture pick up or air oxidation between the time of sampling and analysis. The study served also to qualify the batch of glass bottles which were used for all safeguards inspection samples. The present report describes the results of the qualification of the new type of bottles. It presents also the refinements introduced in the correction procedure following the experience gained in actual practice. 6 references, 4 figures, 5 tables.

32591 **(IAEA-STR—224-Rev.0-Vol.1) Generalized procedures for determining inspection sample sizes (related to quantitative measurements). Vol. 1: Detailed explanations.** Jaech, J.L.; Lemaire, R.J. (International Atomic Energy Agency, Vienna (Austria). Dept of Safeguards). Nov 1986. 24p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702281.

Generalized procedures have been developed to determine sample sizes in connection with the planning of inspection activities. These procedures are based on different measurement methods. They are applied mainly to Bulk Handling Facilities and Physical Inventory Verifications. The present report attempts (i) to assign to appropriate statistical testers (viz. testers for gross, partial and small defects) the measurement methods to be used, and (ii) to associate the measurement uncertainties with the sample sizes required for verification. Working papers are also provided to assist in the application of the procedures. This volume contains the detailed explanations concerning the above mentioned procedures. 11 references.

32592 **(LA-UR—87-1387) Making transuranic assay measurements using modern controllers.** Kuckertz, T.H.; Caldwell, J.T.; Medvick, P.A.; Kunz, W.E.; Hastings, R.D. (Los Alamos National Lab., NM (USA)). 1987. Contract W-7405-ENG-36. 6p. (CONF-870519—2). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009007.

From 9. annual meeting of the European Safeguards Research and Development Association: safeguards and nuclear material management; London, UK (12 May 1987).

This paper describes methodology and computer-controlled instrumentation developed at the Los Alamos National Laboratory that accurately performs nondestructive assays of large containers bearing transuranic wastes and nonradioactive matrix materials. These assay systems can measure fissile isotopes with 1-mg sensitivity and spontaneous neutron-emitting isotopes at a 10-mg sensitivity. The assays are performed by neutron interrogation, detection, and counting in a custom assay chamber. An International Business Machines Personal Computer (IBM-PC) is used to control the CAMAC-based instrumentation system that acquires the assay data. 6 refs., 7 figs.

32593 **(SAND—86-2560C) Alarm communication and display systems for high security department of energy facilities.** Williams, J.S. (Sandia National Labs., Albuquerque, NM (USA)). 1987. Contract AC04-76DP00789. 6p. (CONF-870743—3). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87008524.

From Carnahan conference on security technology; Atlanta, GA, USA (15 Jul 1987).

An Alarm Communication and Display System collects alarm data, presents information to security operators, and enables the operators to enter commands affecting security operations; the ultimate goal of the system is to provide rapid assessment of alarms. This paper presents an overview of the architecture and operating principles used for alarm communication and display systems developed for application at several Department of Energy facilities. Although facilities have unique requirements and procedures, the architecture and operating principles of the ACDS presented in this paper have allowed site-specific implementations at several Department of Energy facilities. In addition, this technology has been transferred to other DOE facilities for adaptation to their requirements. Further efforts to enhance ACDS technology include the use of local area network technology to assist in peripheral switching, a distributed CCTV video switching system, and state-of-the-art hardware changes which improve system performance and effectiveness.

32594 **(UCRL—92877) Nondestructive assay instrumentation for Savannah River Plant reprocessing accountability.** Ruhter, W.D.; Camp, D.C.; Gunnink, R.; Prindle, A.L. (Lawrence Livermore National Lab., CA (USA)). 21 Jun 1985. Contract W-7405-ENG-48. 7p. (CONF-851115—53). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87008749.

From American Nuclear Society winter meeting; San Francisco, CA, USA (10 Nov 1985).

We have designed, developed, and calibrated three different types of nondestructive assay systems for the Savannah River Plant (SRP). These systems will be delivered to SRP in 1986 and become part of the nuclear material accounting instrumentation at one of SRP's reprocessing facilities. Among the various types of nondestructive assay systems to be implemented are a neutron counter (Los Alamos National Laboratory - LANL), a four-station calorimeter (Mound Laboratories), a waste solution assay system (LANL), two gamma-ray solution concentration assay systems (LLNL), two x-ray fluorescence analysis concentration assay systems (LLNL), and one 2-detector plutonium solids isotopics system (LLNL). Los Alamos also has the responsibility of combining the individual measurement systems into an integrated accountability capability. Each NDA instrument will report results to a central Instrument Control Computer (ICC). Figure 1 illustrates schematically the integrated system with each Laboratory's contribution shown by dotted lines.

0560 Legislation And Regulations

REFER ALSO TO CITATION(S) 32923, 32924

32595 **(EGG-M—09287) State implementation of the Low-Level Radioactive Waste Policy Amendments Act of 1985: Progress and issues.** Tait, T.D. (EG and G Idaho, Inc., Idaho Falls (USA)). Mar 1987. Contract AC07-76ID01570. 16p. (CONF-8703122—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009267.

From Atomic industrial forum; Boston, MA, USA (16 Mar 1987).

The 1980 Low-Level Radioactive Waste Policy Act (Public Law 96-573) assigned each state the responsibility for providing disposal capacity for the low-level radioactive waste (LLW) generated within its borders, except for certain LLW generated by the activities of the federal government. The law also authorized and encouraged states to enter into interstate compacts to provide for the establishment and operation of regional LLW disposal facilities. The January 1986 enactment of Public Law 99-240, the Low-Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPAA), resolved an impasse that had delayed congressional consent to seven interstate compacts formed for the regional disposal of LLW. The Act ensures that LLW generators will have continued access to the three existing commercial LLW disposal sites through 1992 as long as their states or regions are in compliance with milestones prescribed in the Act for development of new disposal facilities. Furthermore, the LLRWPAA assigned several responsibilities to the Department of Energy. The objective of the Low-Level Radioactive Waste Policy Amendments Act of 1985 is to ensure the development of an effective, safe, and environmentally acceptable nationwide system for the disposal of LLW by 1993. The Department of Energy is assisting the states and regions to achieve that objective and ensure that the system that is developed provides for the safe management and disposal of LLW at reasonable costs. Furthermore, the Department is working with the states and regions to ensure that while the new system is being developed, there are not disruptions in the current LLW management and disposal practices and that the public continues to receive the benefits of the industries that rely on nuclear materials to deliver their services.

07 ISOTOPE AND RADIATION SOURCE TECHNOLOGY

0701 Physical Isotope Separation

REFER ALSO TO CITATION(S) 33633

32596 **(DOE/ET/33018—1) Isotope separation by chemical exchange process: Final technical report.** Schneider, A. (Georgia Inst. of Tech., Atlanta (USA). School of Mechanical Engineering). Feb 1987. Contract AS05-79ET33018. 79p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE87008359.

The feasibility of a chemical exchange method for the separation of the isotopes of europium was demonstrated in the system $EuCl_3$-$EuCl_2$. The single stage separation factor, α, in this system is 1.001 or 1.0005 per mass unit. This value of α is comparable to the separation factors reported for the U^{4+} - U^{6} and U^{3+} - Y^{4+} systems. The separation of the ionic species was done by precipitation of the Eu^{2+} ions or by extraction of the Eu^{3+} ions with HDEHP. Conceptual schemes were developed for a countercurrent reflux cascades consisting of solvent extraction contractors. A regenerative electrocel, combining simultaneous europium reduction, europium oxidation with energy generation, and europium stripping from the organic phase is described. 32 refs., 22 figs., 6 tabs.

32597 (JINR—R-9-85-707, pp 307-310) **Use of isochronous U-120 M cyclotron in medicine and industry.** Bejshovets, V.; Krzhivanek, M. (Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia). 1985. (In Russian). NTIS (US Sales Only), PC A16/MF A01. File Number DE87780133. (CONF-8506350—).

From International conference on cyclotrons and their application; Bechine, Czechoslovakia (25 Jun 1985).

Application of the U-120M cyclotron for medical-purpose / sup 67/Ga, /sup 201/Tl and /sup 123/I isotope production by proton irradiation of targets is described. The attention is paid to optimization of the radiation process. Experiments for applied investigations (general-purpose isotope production, dosimeter calibration, investigation of the effects of accelerated particles and secondary radiation on different materials and semiconductor units) are carried out. 3 figs.; 1 tab.

0702 Radiation Sources

REFER ALSO TO CITATION(S) 33277, 33307, 33443, 33444, 33445, 34223

32598 (INIS-mf—10889, pp 14) **Nuclear radiation sources in chemical technology.** Breger, A.Kh. (Karpov Institute of Physical Chemistry, Moscow, USSR). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

32599 (INIS-mf—10889, pp 27) **Multipurpose technological gamma irradiator.** Floru, C.; Ponta, C.; Nicolescu, D. (Institutul de Fizica si Inginerie Nucleara, Bucharest, Romania). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

32600 (INIS-mf—10889, pp 5) **Dosimetry and computer experiments in gamma irradiation units.** Baer, M.; Remer, M. Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

32601 (INIS-mf—10889, pp 66) **Irradiation optimization on radionuclide sources.** Pesek, M.; Hospes, M. (Ustav pro Vyzkum, Vyrobu a Vyuziti Radioisotopu, Prague, Czechoslovakia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

32602 (INIS-mf—10889, pp 35) **Technological aspects of radiation cross-linking of cables and tubes with electrons.** Heinrich, H.J.; Haedrich, W.; Posselt, K.; Roehr, L.; Fluegge, D. (Kombinat VEB Kabelwerk Oberspree, Berlin, German Democratic Republic). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

32603 (INIS-mf—10889, pp 78) **Mobile irradiator and its application in preservation of the objects of art.** Teply, J.; Cervenka, V.; Franek, C.; Kraus, R. (Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia; Vyvojovy Zavod Uranoveho Prumyslu, Zbraslav nad Vltavou, Czechoslovakia; Vyzkumny a Vyvojovy Ustav Drevarsky, Prague, Czechoslovakia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

32604 (INIS-mf—10889, pp 79-80) **Radiation processing applications in the Czechoslovak water treatment technologies.** Vacek, K.; Pastuszek, F.; Sedlacek, M. (Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia; Vodni Zdroje, Prague, Czechoslovakia; Vyzkumny Ustav Vodohospodarsky, Prague, Czechoslovakia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

08 HYDROGEN

0801 Production

REFER ALSO TO CITATION(S) 32606

32605 **Method of producing metallized chloroplasts and use thereof in the photochemical production of hydrogen and oxygen.** Greenbaum, E. (to Dept. of Energy, Washington, DC). US Patent 4,657,646. 14 Apr 1987. Filed date 25 Nov 1985. vp.

A process is described for converting light energy to stored chemical energy comprising: (a) preparing metallized chloroplasts by isolating chloroplasts; introducing a solution of a soluble compound of a metal catalyst to the isolated chloroplasts; chemically binding a colloidal metal catalyst from the soluble compound onto the surface of the isolated chloroplasts at locations of photosynthetic reduction by reducing the metal resulting in metallized chloroplasts; (b) depositing the metallized chloroplasts on a nonreacting solid support medium; (c) placing the metallized chloroplasts and the solid support medium within an enclosed chamber having an inlet for introducing reactant and an outlet for removing products; (d) directing light including wavelengths from 400 to 700 nm onto the metallized chloroplasts; (e) introducing into the chamber a reactant capable of undergoing a reaction in the presence of the light and the metallized chloroplast to produce stored chemical energy in the form of a product or products of the reaction; and (f) removing the product or products from the chamber.

0804 Marketing And Economics

32606 (EUR—8651, pp 407-420) **Energy LP modelling: prospects for non-fossil derived hydrogen.** Clifford, J.S.; Weston, B.S. 1983. European Community Information Service, 2100 M St., NW, Suite 707, Washington, DC 20037. (CONF-8305311—).

From 3. international seminar on hydrogen as an energy carrier; Lyon, France (25 May 1983).

The Commission's Polynational Polyperiod Energy Flow Optimisation Model was used to explore potential uses for non-fossil derived hydrogen produced from nuclear electricity as an extender for coal in the synthesis of synthetic oil and gas. The market for these synthetic fuels is dependent on relative prices and availabilities of imported fossil fuels and nuclear electricity. The existing model was modified and extended to allow the study of the long term trends for 5 processes which were expected to become significant during the twenty-first century. The results show that, given a continuation of the long term increase in energy prices, a substantial European market could develop for the products of coal conversion. Where low cost electricity is readily available, the requirements for coal derived oil and gas are relatively low. However, where coal is relatively expensive, NFD hydrogen is a high priority use of electricity, amounting to up to 5% of the total secondary energy market. 7 refs.

09 OTHER SYNTHETIC AND NATURAL FUELS

0901 Hydrocarbon Fuels

32607 (DOE/CS/69135—T3) **Waste to energy applications in the Wisconsin canning industry: Economic and environmental evaluation of anaerobic treatment of vegetable processing wastewaters using a fixed film reactor: Project report.** Stack, C.R.; Stover, E.L. (Wisconsin Div. of State Energy and Coastal Management, Madison (USA)). Jan 1987. Contract FG02-80CS69135. 39p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87009881.

This study was conducted to investigate the economic and environmental consequences of anaerobic wastewater treatment applied to a vegetable canning plant owned by Our Best Foods, Inc., Pulaski, Wisconsin. A pilot scale, upflow fixed film anaerobic reactor was utilized to determine pollutant removal efficiency, operational parameters, and basis of design of conceptual full scale conceptual full scale systems. Hydraulic retention times (HRT) as low as twelve hours and organic loading rates as high as 1.6 pounds total chemical oxygen demand (COD) per cubic foot of media per day were achieved during the pilot study. The total and soluble COD removals averaged 59% and 79% respectively for the duration of the study. The biogas produced from the anaerobic treatment pilot system typically contained 60 to 65% methane. About 3.0 cubic feet of methane (5.5 cubic feet of biogas) were produced at standard temperature and pressure (STP) per one pound of total COD removed. Wastewaters used in this study were found to be highly variable in their strength and chemical composition. Based upon the results of the pilot study, the projected economics of different hypothetical wastewater treatment options were examined and compared to the economics of the present waste disposal program. 18 refs., 2 figs., 8 tabs.

32608 (NZERDC—124) **Biological production of methane from Southland lignite: A literature survey: Final report.** (Cawthron Inst., Nelson (New Zealand)). Dec 1985. 26p. NTIS (US Sales Only), PC A03/MF A01. File Number DE87900754.

This report reviews the literature relevant to the biological conversion of lignite to gaseous and liquid products. The purpose was to summarize the present knowledge of bioconversion of coal, peat and lignin, in order to assess the feasibility of lignite bioconversion to methane or liquid fuels. While peat is biochemically altered lignocellulose, lignite can be regarded as the product of physical/chemical action on lignocellulose similar to the geochemical processes leading to coal. Lignite is likely to resist rapid microbial degradation so that a physical/chemical conversion of the feedstock into a biodegradable form would be a necessary pretreatment for any lignite bioconversion process. Lignite pretreatment may be done by oxidation and wet air oxidation. Recent advances in the understanding of aerobic enzymatic lignin breakdown suggest that a biological pretreatment of lignite may be possible in the distant future. Biogasification of peat pretreatment products is technically feasible, and up to 30% conversion efficiency of peat to methane can be obtained. 124 refs., 9 figs.

32609 **Supported metal cluster catalysts for synthesis gas conversion.** Pierantozzi, R. (Corporate Science Center, Air Products and Chemicals, Inc., P.O. Box 538, Allentown, PA 18105). pp 115-134 of Catalysis of organic reactions. Augustine, R.L. New York, NY; Marcel Dekker Inc. (1984). (CONF-8405293—).

From 10. conference on catalysis of organic reactions; Williamsburg, VA, USA (7 May 1984).

Supported metal clusters anchored to inorganic oxides such as SiO/sub 2/, Al/sub 2/O/sub 3/, MgO, and TiO/sub 2/ represent a potential new class of metal catalysts. Studies have been reported on the use of metal clusters as precursors to supported metal cata-

lysts and also on the use of intact clusters as catalysts. This paper presents a review of some of the relevant literature in this field as well as results from our laboratories. New results from our laboratories on CeO/sub 2/ supported clusters show that the use of a cluster results in the formation of a catalyst that is selective for the synthesis of olefins from CO + H/sub 2/. Other precursors produce catalysts that give higher CH/sub 4/ yields as well as lower olefin selectivities.

0902 Alcohol Fuels

REFER ALSO TO CITATION(S) 32455

0904 Solid Waste And Wood Fuels

REFER ALSO TO CITATION(S) 33112, 33120

32610 **(DOE/OR/21390—T7) Wood burning for energy: Case studies from the Great Lakes.** Feely, A. (Council of Great Lakes Governors, Inc., Madison, WI (USA)). Sep 1986. Contract FG05-83OR21390. 52p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87009884.

The intent of Burning Wood for Energy: Case Studies from the Great Lakes is to document the experiences of representative companies and institutions located in the Great Lakes program region that have converted since 1979, the year when a recession and escalating oil prices endowed wood fires with a rosier glow. Given that the equipment developed for industrial-scale wood burning has become ever more sophisticated, the experiences with the systems recorded vary considerably. The retrofits and new system installation histories described differ in terms of system sizing and application, as well; therefore, the insights of the plant managers, owners and designers of the systems described are likely to pertain in some measure to the reader's particular situation, with the understanding that wood system installation, by its nature, is a highly individualized affair. The case studies are preceded by a brief overview of the principles of wood fuel combustion, the types of systems used to process fuel, pertinent facts about fuel procurement, storage and handling, and general information on emissions. 36 figs., 5 tabs.

32611 **(DOE/OR/21390—T8) Combustion of crop residues for energy: Case studies from the Great Lakes.** Feely, A. (Council of Great Lakes Governors, Inc., Madison, WI (USA)). Jan 1987. Contract FG05-83OR21390. 53p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87009885.

The intent of Combustion of Crop Residues for Energy: Case Studies from the Great Lakes is to document the experiences of farmers and other rural users who burn agricultural residues to produce energy. The predominant application of this energy is for grain drying, although some of the case studies highlight use of crop residues to generate energy for space heating in schools, homes, greenhouses, and farm outbuildings. Agricultural residues, for the purposes of this report, are defined as field crop trimmings, stalks, foliage, and in the case of the corn plant, the cobs.

32612 **(DOE/OR/21390—T9) Industrial commercial wood energy conversion: A guide to wood burning, fuel storage, and handling systems.** (Council of Great Lakes Governors, Inc., Madison, WI (USA)). 1987. Contract FG05-83OR21390. 91p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE87009886.

During the past decade, more than 400 organizations in the Great Lakes region have cut expenditures by implementing energy conservation measures and converting their facilities to wood fuel. The Great Lakes states have vast acreages of forestland which contain large amounts of wood resources available for energy use. The technology for efficiently harvesting and burning wood fuel is readily available and has been utilized by the forest-products industry for many years. This handbook is intended to assist those interested in wood energy to make preliminary decisions regarding their potential for utilizing wood. Each section covers a different aspect of the total wood energy system: wood fuel, fuel procurement, fuel storage and handling, combustion equipment, emissions, economics and financing. While the sections explaining wood fuel and wood fuel technology should be considered as they relate to the user's specific application, saving money is the primary factor determining the feasibility of wood energy conversions.

32613 **(NP—7900733) Combustion of straw.** Lappin, M. (Organization for Economic Co-Operation and Development, 75 - Paris (France)). Nov 1986. 97p. NTIS (US Sales Only), PC A05/MF A01. File Number DE87900733.

From an economic standpoint straw has particular advantages over the other biomass residues for solid fuel combustion as the processes of harvesting, baling, transporting and combustion are already mechanised. The greatest potential use of surplus straw is as a fuel. While there is considerable on-farm use of straw as a fuel, the surplus straw resource in most countries still far exceeds this market demand. Straw may be converted into energy by direct combustion or by anaerobic fermentation. From an energy standpoint combustion is preferable as the net energy yield is 1.8 to 2.3 times greater than that obtained by the biochemical processes. The combustion process is also the only practical way of releasing the straw energy on the farm. Straw used in this way can only replace part of the energy requirement of agriculture, so it is appropriate to look at the breakdown of a nation's energy use to see where the best opportunities for substitution can occur. 30 refs., 25 figs., 27 tabs.

32614 **(TVA/OACD/BIO—87/7) Case studies of biomass energy facilities in the Southeastern US.** (Meridian Corp., Falls Church, VA (USA); Tennessee Valley Authority, Muscle Shoals, AL (USA). Office of Agricultural and Chemical Development; Tennessee Valley Authority, Muscle Shoals, AL (USA). Biomass Program). Aug 1986. 198p. NTIS, PC A09/MF A01; 1; GPO Dep. File Number DE87009367.

A principal goal in producing this collection of case studies was to demonstrate diversity and the fact that biomass energy systems are a "here and now" technical and economic reality throughout the region. A map shows the regional dispersion of the case study facilities. A facilities matrix showing the diversity of biomass options in terms of the types of facilities and industrial processes served, the types of biomass feedstocks used and the conversion systems employed is provided.

13 HYDRO ENERGY

1301 Resources And Availability

32615 **(DOE/BP—785) The water budget: Annual report.** Maher, M. (USDOE Bonneville Power Administration, Portland, OR. Div. of Fish and Wildlife). Dec 1986. 50p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87009932.

This report encompasses the first three years (1983, 1984, and 1985) of operation. It includes: (1) background and history of the development of the Water Budget concept including a discussion of Water Budget manager positions; (2) implementation of the Water Budget since its formulation by the Council in 1983; (3) a discussion of the research and monitoring funded by BPA; and (4) a discussion of Section 304 of the Council's Program.

1305 Economics And Management

32616 **(DOE/BP/16229—1) Data collection for resource supply forecast: Final report, 1985.** (Northwest Small Hydroelectric Association, Bend, OR (USA)). Jun 1986. Contract AC79-84BP16229. 198p. NTIS, PC A09/MF A01; 1; GPO Dep. File Number DE87008476.

The Northwest Small Hydroelectric Association conducted a survey of hydropower site development in the Northwest region to secure information which would provide an improved knowledge and understanding of the cost and seasonality of the hydropower resource available to the Northwest. Information was collected from a cross section of projects, including those operating, under construction and in the planning stages. The window of time

selected for the study included applications filed with the Federal Energy Regulatory Commission (FERC) through December 31, 1983, in the four Northwest states comprising the Bonneville Power Administration (BPA) service area. 27 tabs.

1306 Environmental Aspects

REFER ALSO TO CITATION(S) 32615, 32697, 33724, 33760, 33762, 33864

32617 **(DOE/BP/18966—2) Ural-Tweed bighorn sheep, Wildlife Mitigation Project: Annual report, January 1, 1986-December 31, 1986.** Yde, C.; Summerfield, B.; Young, L. (Yde (Chris), Helena, MT (USA); Forest Service, Libby, MT (USA). Kootenai National Forest). Mar 1987. Contract AI79-84BP18966. 68p. NTIS, PC A05. File Number DE87009905.

This report summarizes the results of the project activities from September 1, 1984 to December 31, 1986. To date, habitat treatments have been initiated on eight areas. The treatments include selective slash and burn, prescribed fire and fertilization. Inclement weather precluded the completion of the prescribed burns scheduled during fall 1985 and fall 1986. The lower Stonehill prescribed fire was rescheduled from fall 1985 to spring 1986 with the burn accomplished, producing varied results. Extensive pretreatment vegetative information has been collected from all units scheduled for habitat manipulations. Additionally, future projects have been delineated for other areas frequented by bighorn sheep. Ten adult bighorn sheep (5 ewes and 5 rams) have been fitted with radio transmitters. Systematic aerial and ground surveys were utilized to monitor the movements and seasonal habitat preferences of the instrumented sheep. Age and sex information was gathered whenever possible to aid in the development of a population model. Monthly pellet group collections were initiated in May 1985 to provide samples for 2.6 diaminopimetic acid (DAPA), food habits and lungworm larvae analysis. The majority of the data analysis is ongoing and will be presented in later reports.

32618 **(DOE/BP/23666—1) Instream flows needed for successful migration spawning and rearing of rainbow and westslope cutthroat trout in selected tributaries of the Kootenai River: Final report, 1986.** Marotz, B.; Fraley, J. (Montana Dept. of Fish, Wildlife and Parks, Kalispell (USA)). Feb 1987. Contract AI79-85BP23666. 191p. NTIS, PC A09/MF A01; 1; GPO Dep. File Number DE87009904.

This study was conducted by Montana Department of Fish, Wildlife and Parks in contractual agreement with Bonneville Power Administration and addresses measure 804(a)(9) of the Northwest Power Planning Council's Columbia River Basin Fish and Wildlife Program. Objectives were to determine instream flow needs in Kootenai River tributaries to maintain successful fish migration, spawning and rearing habitat of game fish, evaluate existing resident and rearing fish populations, and compile hydrologic and fishery information required to secure legal reservation of water for the fishery resource.

32619 **(DOE/BP/63365—1) An analysis of alternative fish transportation strategies: Completion report, 1986.** Harper, R.J. (USDOE Bonneville Power Administration, Portland, OR. Div. of Fish and Wildlife). Mar 1987. Contract AI79-86BP63365. 62p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87009912.

This report examined the potential for an expanded fish transportation program under an assumption of fully operational fish bypass facilities being present at mainstream Snake and Columbia River hydroelectric facilities. The US Army Corps of Engineers FISHPASS model was used for the analysis. Results indicated that additional transportation would be of marginal benefit to any stocks except those entering the pool immediately above the dam being considered. For this reason, Ice Harbor Dam is least attractive for addition of transport. John Day and Lower Monumental were the most attractive as preferred locations for transportation facilities. The effect of variations in turbine mortality was very small when compared to changes in reservoir mortality. For yearling chinook, halving reservoir mortality nearly doubled survival rates while doubling reservoir mortality caused a 75% decrease in survival. In contrast, doubling turbine mortality dropped survival rates by 28% and halving turbine mortality resulted in an increase of 1.17 times the base survival rate. Mortality outside the scope of the study was also considered and its effect on modeling results was discussed.

14 SOLAR ENERGY

1401 Resources And Availability

REFER ALSO TO CITATION(S) 33073

1403 Economics

REFER ALSO TO CITATION(S) 32654, 32667

1405 Solar Energy Conversion

REFER ALSO TO CITATION(S) 32605, 32607, 32610, 32611, 32613, 32614, 32655, 32658, 33689, 33767, 33775

32620 **(BNL—39204) Personal safety in thin-film photovoltaic cell industries.** Fthenakis, V.M.; Moskowitz, P.D.; Hamilton, L.D. (Brookhaven National Lab., Upton, NY (USA)). Jan 1986. Contract AC02-76CH00016. 21p. (CONF-8601110—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87007144.

From SERI photovoltaics safety conference; Lakewood, CO, USA (16 Jan 1986).

Analysis of potential health and safety risks of new photovoltaic technologies is required before they become fully commercialized, so that alternative strategies may be developed, engineering design costs reduced, and health risks minimized. In response to this need, the US Department of Energy-National Photovoltaic Program is supporting research at Brookhaven National Laboratory (BNL) to identify and evaluate health hazards related to production of thin-film photovoltaic cell production technologies. This paper summarizes results of studies focusing on occupational health.

32621 **(BNL—39208) Potential health and safety hazards associated with the production of gallium arsenide alloy based multi-junction photovoltaic cells.** Lee, J.C.; Moskowitz, P.D. (Brookhaven National Lab., Upton, NY (USA)). Sep 1985. Contract AC02-76CH00016. 25p. NTIS, PC A02/MF A01; GPO Dep. File Number DE87007145.

This report identifies potential health and safety hazards posed by feedstock materials and residuals generated in the large-scale manufacture of gallium arsenide alloy based multi-junction photovoltaic cells. Hazards were identified by studying detailed process-level data for the metallorganic chemical vapor deposition technique used in depositing GaAsP/GaInAS and AlGaAs/GaInAs multiple junction cells. In accidental situations, the large quantities of arsine and phosphine required as feedstocks for production of these cells may present health hazards to workers and to the public. Although large quantities of metallorganic compounds are also required as input feedstocks, there is little toxicologic data available on these compounds. Health to workers may also be adversely affected by the inhalation, during routine clean-up, of GaAs alloy particulate depoited on reactor walls. A fraction of these particulates may also be vented to the outside environment with other atmospheric exhaust gases and present a potential threat to public health.

32622 **(BNL—39553) Protein kinase and phosphatase activities of thylakoid membranes.** Michel, H.; Shaw, E.K.; Bennett, J. (Brookhaven National Lab., Upton, NY (USA)). 1987. Contract AC02-76CH00016. 18p. (CONF-870286—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87008718.

From Symposium on plant membranes; Park City, UT, USA (9 Feb 1987).

Dephosphorylation of the 25 and 27 kDa light-harvesting Chl a/b proteins (LHCII) of the thylakoid membranes is catalyzed by a phosphatase which differs from previously reported thylakoid-

bound phosphatases in having an alkaline pH optimum (9.0) and a requirement for Mg^{2+} ions. Dephosphorylation of the 8.3 kDa psb H gene product requires a Mg^{2+} ion concentration more than 200 fold higher than that for dephosphorylation of LHC II. The 8.3 kDa and 27 kDa proteins appear to be phosphorylated by two distinct kinases, which differ in substrate specificity and sensitivity to inhibitors. The plastoquinone antagonist 2,5-dibromo-3-methyl-6-isopropyl-benzoquinone (DBMIB) inhibits phosphorylation of the 27 kDa LHC II much more readily than phosphorylation of the 8.3 kDa protein. A similar pattern of inhibition is seen for two synthetic oligopeptides (MRKSATTKKAVC and ATQTLESSSRC) which are analogs of the phosphorylation sites of the two proteins. Possible modes of action of DBMIB are discussed. 45 refs., 7 figs., 3 tabs.

32623 (BNL—39694) Evaluation of environmental control equipment for thin film silicon photovoltaic cell processing: Phase I. Khanna, A.K.; Gupta, R.; Joseph, A.; Singh, N.; Vojtek, M.E. (Brookhaven National Lab., Upton, NY (USA)). Jan 1987. Contract AC02-76CH00016. 34p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87010044.

Thin film silicon:hydrogen alloys are commanding an increasing share of the photovoltaic marketplace. Due to the hazardous nature of the materials involved in their manufacture, it is important to control and render harmless those reactants that are not consumed as inert coating. Environmental control equipment used for such purposes must meet important safety, throughput, efficiency, and reliability requirements. This report discusses the analytical methodology and performance results obtained for various environmental systems evaluated at a photovoltaic research facility.

32624 (CONF-8706109—1) Corn products as chemical feedstocks: The corn refinery. Scott, C.D. (Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 7p. NTIS, PC A02/MF 01; 1; GPO Dep. File Number DE87010403.

From 1. national corn utilization conference; St. Louis, MO, USA (11 Jun 1987).

An integrated use of all of the components of the corn plant would be much more efficient than simply emphasizing carbohydrate recovery and use of crude by-products that result from carbohydrate processing. In this sense, the processing of corn would be similar to the processing of petroleum in a refinery and any successive petrochemical processing that is carried out. In such a Corn Refinery, both the harvesting residues and the grain would first be fractionated into crude feed or product materials after which each fraction would be further refined as a final product or serve as the feed material for biological or chemical conversion processes. Primary intermediate feed material for conversion processes or for further refining into final products would include carbohydrate monomers and polymers and modified lignin, as well as components of the grain which would include oils, proteins, fiber, and carbohydrates. The refinery will include somewhat conventional processing steps previously developed for corn milling and ethanol production, as well as advanced techniques for fractionating and refining the stover and cobs, and thermal/chemical conversion processes for producing a variety of new chemical products. 1 fig., 1 tab.

32625 (DOE/CE/89008—T1) Ion implantation parametric study and conducting layer studies for semiconductor contracts: Final report, December 1, 1977 to September 30, 1986. Nicolet, M.A. (Jet Propulsion Lab., Pasadena, CA (USA)). 20 Oct 1986. Contract AI01-85CE89008. 28p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87005965.

The goal of the project was to assist JPL in assessing the effects of using a non-mass-analyzed ion beam on solar cells whose junction is formed by ion implantation. Specifically, implantations with the Caltech mass-analyzed beam were called for to test individually the influence of parameters that are distributed in a non-mass-analyzed beam. The project was carried out in collaboration with Optical Coatings Laboratory, Inc. (now Applied Solar Energy Corp.), where the Si wafers implanted at Caltech were processed to complete solar cells and their performance was evaluated.

32626 (DOE/ER/12085—T3) Unraveling photosystems: Progress report, 1984-85. Bogorad, L. (Harvard Univ., Cambridge, MA (USA)). 28 Feb 1985. Contract AC02-82ER12085. 5p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009613.

Cyanobacteria provide an ideal model system for studying the molecular biology of photosynthesis. Not only do these organisms perform higher-plant-type oxygenic photosynthesis, they also are amenable to genetic manipulation and analysis. During the past few years, it has been demonstrated that various cyanobacterial species are transformable with purified DNA. During the past year we have been examining alternate methods of introducing stable expressible DNA sequences into dyanobacteria. These methods do not rely on the isolation and characterization of cyanobacterial DNA sequences, but permit introduction of sequences cloned in "standard" E. coli vectors and allow for the recovery of introduced DNA segments.

32627 (DOE/ER/12085—T4) [Unraveling photosystems]: Progress report, July 1, 1982-June 30, 1983. Bogorad, L. (Harvard Univ., Cambridge, MA (USA)). 1983. Contract AC02-82ER12085. 33p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87009614.

The overall objective of this program is to identify and characterize genes for components of the photosynthetic apparatus - especially genes for components of photosystem II (PS II). During the past year two atrazine resistant mutants of the blue-green alga Anacystis nidulans R-2 have been isolated and partially characterized. Thylakoid membranes have been prepared from these cells as well as from wild type cells and their rates of oxygen evolution measured in the presence and absence of atrazine. The I_{50} for the two mutants was approximately 2×10^{-6}M whereas for wild type cells it was 7.5×10^{-10}M. Visible absorption and fluorescence emission spectra of the mutant and wild type cells have been compared. One of the mutants possesses spectra similar to the wild type while the second mutant does not. The latter mutant appears to have increased absorption peaks due to phycocyanin and allophycocyanin. DNA has been purified from both atrazine resistant mutants and used to transform wild type cells to atrazine resistance. Transformation of cells to the resistant phenotype is reproducible although the frequency of transformation varies. "Mutant DNA" subjected to restriction enzyme cleavage prior to use for transformation yields transformants but the frequency is generally about one order of magnitude lower than with uncut DNA. 54 refs., 3 figs.

32628 (DOE/ER/13261—1) Electrochemical and optical studies on model photosynthetic systems: Progress report for the period 7/1/84 to 12/1/86. Cotton, T.M. (Nebraska Univ., Lincoln (USA). Dept. of Chemistry). Dec 1986. Contract FG02-84ER13261. 38p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87010086.

Objective of this research is to study the relation between the structure of photosynthetic pigments and their spectroscopic and electrochemical properties. Model systems under study progress from the least ordered (solutions) through the most highly ordered (Langmuir-Blodgett (LB) monolayers) systems containing BChl, BPheo, and UQ. Vesicles, intermediate between solutions and LB monolayers, are also under investigation. Molecules other than the photosynthetic pigments and quinones have been examined, including chromophores (i.e., surface active cyanine dyes and phthalocyanines) and redox active compounds (methyl viologen (MV) and surfactant ferrocenes), in order to develop the techniques needed to study the photosynthetic components. The chlorophylls are photosensitive and labile. Thus, it is easier first to develop procedures using stable species. During this period, we have focused on the application of electrochemical methods for determining the heterogeneous electron transfer rate constants of BChl and BPheo at metal electrodes (Pt and Au). We have also determined the effect of adsorption on the redox properties of quinones. Resonance Raman (RR) and surface enhanced resonance Raman (SERR) spectroscopy were used to study solution and surface species.

32629 **(DOE/ER/13543—1) Soybean Ribulose bisphosphate carboxylase small subunit gene family: Gene structure and regulation of gene expression: Progress report for the period 6/1/86-5/31/87.** Meagher, R. (Georgia Univ., Athens (USA)). 1987. Contract FG09-86ER13543. 6p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009658.

The effects of white light and far-red light on transcription rates and steady state mRNA levels of two closely related soybean RuBPCss genes, SRS1 and SRS4, have revealed a system of light regulated RNA turnover. Transcription of these genes is 30 to 50 fold higher in fully light grown seedlings than in etiolated seedlings. In contrast, steady state mRNA levels are only 8 to 10 fold higher in light than in darkness. Furthermore, when etiolated seedlings are placed in light, RuBPCss transcription increases to the level found in light grown seedlings within 12 hours, but the steady state mRNA levels of these genes do not begin to increase for at least 24 hours. We therefore hypothesize that light induction of RuBPCss transcription in soybean is paralleled by a significant increase in the mRNA turnover rate, perhaps related to the concomitant increase in the rate of translation. Interestingly, the high turnover rate appears to be maintained for some time after light grown plants are treated with far-red light, even though this treatment rapidly shuts down RuBPCss transcription. 4 refs.

32630 **(DOE/ER/13594—1) Photosynthesis in intact plants: [Progress report].** (Illinois Univ., Urbana (USA). Dept. of Physiology and Biophysics). 1987. Contract FG02-86ER13594. 15p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010030.

The objective was to study photosynthesis in intact plants, both in the laboratory and the field, with a view to determining if the limitations on growth under normal or stressed conditions arise from limitations in photosynthesis. This work is complemented by studies on in vitro systems using biophysical methods, and by studies on genetically modififed strains. Several laboratory based instruments have been constructed including a field flash-fluorescence photometer, and a fluorescence induction photometer, while a field flash-spectrophotometer is still under development. The fluorescence machines have been used in the study of the two-electron gate in vivo, and its modification in herbicide resistant strains. We are extending these studies to look at the binding and unbinding of herbicides using a rapid mixing apparatus linked to a flash-fluorescence photometer. 22 refs., 1 fig.

32631 **(DOE/ER/13614—1) The microbiology and physiology of anaerobic fermentations of cellulose: Progress report for the period 3/1/86-5/1/87.** Peck, H.D. Jr.; Ljungdahl, L.G.; Mortenson, L.E.; Wiegel, J.K.W. (Georgia Univ., Athens (USA)). 1987. Contract FG09-86ER13614. 21p. NTIS, PC A02/MF A01; GPO Dep. File Number DE87009648.

It has become increasingly obvious that studies concerning the utility of anaerobic microorganism for biomass conversions are completely limited by our lack of specific basic biochemical, enzymological and genetic information concerning these microorganisms. The focus of this research is toward the cellulase from clostridia which has been shown to be of very high molecular weight and completely different from the well studied fungal systems; towards the enzyme involved in the net formation of acetate in anaerobic bacteria constituting new mechanism of autotrophic CO_2 fixation; toward the hydrogenase system which appears to involve at least five different types of hydrogenase and two important enzymes of one carbon metabolism, formate dehydrogenase and carbon monoxide dehydrogenase. 70 refs.

32632 **(DOE/JPL—1012-125-Vol.5) Flat-Plate Solar Array Project: Final report: Volume 5, Process development.** Gallagher, G.; Alexander, P.; Burger, D. (Jet Propulsion Lab., Pasadena, CA (USA)). Oct 1986. Contract AI01-85CE89008. 72p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87009229.

The goal of the Process Development Area, as part of the FSA Project, was to develop and demonstrate solar cell fabrication and module assembly process technologies required to meet the cost, lifetime, production capacity, and performance goals of the FSA Project. Early in the Assessment Phase, it became apparent that available processes were incapable of meeting the cost of the Project. Also, neither the 20-year (later increased to 30-year) reliability goal nor the effects of processing on reliability has ever been assessed. This document is a summary of the FSA-sponsored research and development efforts expended by Government, Industry, and Universities in developing processes capable of meeting the Project's goals during volume production conditions. The cost goals allocated for processing were demonstrated by all volume quantities that were extrapolated by cost analyses to large-volume production. Program redirection precluded planned large-volume demonstrations and, in the final phase of the Project, efforts were directed toward research-oriented processing to produce high-efficiency cells. High-efficiency crystalline silicon solar cells are continuing to evolve in research laboratories. When efficiency increases resulting from these new cell designs level off, there is a need to develop high-volume, low-cost processes that will reatin these efficiency improvements and capture the economic benefits. To provide proper focus and coverage of the Process Development effort, four separate technology sections are discussed in this document: surface preparation, junction formation, metallization, and module assembly.

32633 **(DOE/JPL—1012-125-Vol.7) Flat-Plate Solar Array Project: Final report: Volume 7, Module encapsulation.** Cuddihy, E.; Coulbert, C.; Gupta, A.; Liang, R. (Jet Propulsion Lab., Pasadena, CA (USA)). Oct 1986. Contract AI01-85CE89008. 78p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE87009233.

The objective of the Encapsulation Task was to develop, demonstrate, and qualify photovoltaic (PV) module encapsulation systems that would provide 20-year (later increased to 30-year) life expectancies in terrestrial environments, and which would be compatible with the cost and performance goals of the FSA Project. The scope of the Encapsulation Task included the identification, development, and evaluation of material systems and configurations required to support and protect the optically and electrically active solar cell circuit components in the PV module operating environment. Encapsulation material technologies summarized in this report include the development of low-cost ultraviolet protection techniques, stable low-cost pottants, soiling resistant coatings, electrical isolation criteria, processes for optimum interface bonding, and analytical and experimental tools for evaluating the long-term durability and structural adequacy of encapsulated modules. Field testing, accelerated stress testing, and design studies have demonstrated that encapsulation materials, processes, and configurations are available that will meet the FSA cost and performance goals. Thirty-year module life expectancies are anticipated based on accelerated stress testing results and on extrapolation of real-time field exposures in excess of 9 years.

32634 **(NP—7900687) Development of high efficiency solar cells: Final report, December 1984 thru June 1986.** Ho, F.; Chu, C.; Iles, P.A. (Applied Solar Energy Corp., City of Industry, CA (USA)). 1986. 30p. Applied Solar Energy Corp., 15251 E. Don Julian Road, City of Industry, CA 91746. File Number TI87900687.

It was the purpose of this project to develop silicon solar cells with AM-1 sun efficiency above 20% at 28°C. Following the models of cells theoretically derived by Dr. C.T. Sah, ASEC would try to develop processes to demonstrate the possibility of making cells with over 20% efficiency. The cells made used silicon with resistivities in the range from 0.3 ohm-cm to 50 ohm-cm; it was recognized that higher resistivities would increase the Isc, if good quality silicon in the higher resistivity range was used. Cell thicknesses were 3 to 8 mil, although ASEC had shown that thinner cells had better carrier collection efficiency for some of the structures used.

32635 **(NP—7900770) Retrospective search on densification of forest residues, wood wastes, and agricultural wastes.** (Institute for Industrial Research and Standards, Dublin (Ireland). Information Technology Group). Nov 1986. 42p. NTIS (US Sales Only), PC A03/MF A01. File Number DE87900770.

This literature search covering various aspects of densification, such as briquetting, compacting, pressing, baling, grinding and pelletizing of wood wastes or agricultural wastes covers the period of 1980 to 1986. Each of 172 listed is provided with basic bibliographic data and an abstract.

32636 **(SAND—86-7052) Development of metallization for GaAs and AlGaAs concentrator solar cells.** Tobin, S.P. (Spire Corp., Bedford, MA (USA)). Apr 1987. Contract AC04-76DP00789. 113p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE87007951.

A three-layer metallization system was developed for high temperature stability on GaAs and AlGaAs solar cells. The layers are a Pt ohmic contact metal that forms thermally stable compounds with GaAs, a TiN diffusion barrier, and a gold conductor. The solar cell structure was also designed for contact stability, with the key component being a heavily doped GaAs cap layer. Reactively sputtered TiN was found to act as an excellent barrier when deposited under the proper conditions. The conditions were carefully optimized for low resistivity and low stress in the films. A low but nonzero substrate bias during sputtering was found to be important. Solar cells with sputtered metallizations of Pt/TiN/Ti/Pt/Au were found to be thermally stable up to 500°C for 15 minutes in vacuum. At 600°C there was catastrophic degradation of the cells due to dissociation of uncapped GaAs surfaces. Below this temperature the metallization performed as designed. The Pt and GaAs layers reacted to form a stable PtGa compound layer that gave low contact resistance. There was no penetration of Au or GaAs through the barrier layer. These results are a very encouraging first step leading to stable, reliable GaAs and AlGaAs concentrator cells.

32637 **(SAND—87-1214C) A fast-transient technique for separating base and emitter recombination components in planar silicon solar cells.** Basore, P.A. (Sandia National Labs., Albuquerque, NM (USA)). 1987. Contract AC04-76DP00789. 7p. (CONF-870528—14). IEEE, 345 E 47th St., New York, NY 10017. File Number TI87009498.

From 19. IEEE photovoltaic specialists conference; New Orleans, LA, USA (4 May 1987).

A new fast-transient technique is presented which directly determines the base component of a solar cell's dark current using data from a single short-circuit current decay measurement. The technique is based on fitting the measured cell current to the form expected for the diffusion of minority carriers into a semi-infinite slab. The approach is limited to small-area cells that operate in low-level injection. The validity of the fast-transient technique is established by performing detailed numerical simulations of the transient experiment for worst-case and typical cell configurations. Experimental results are given for five low-resistivity cells that are expected to have similar base characteristics, confirming that consistent results can be obtained by this method.

32638 **(SAND—87-7007) High-efficiency silicon concentrator solar cells.** Green, M.A.; Blakers, A.W.; Jianhua, Zhao; Taouk, M.; Narayanan, S.; Campbell, P. (Joint Microelectronics Research Centre, Kensington (Australia)). May 1987. Contract AC04-76DP00789. 128p. NTIS, PC A07/MF A01; 1; GPO Dep. File Number DE87010158.

Recent developments in the non-concentrating silicon cell area have been applied to concentrator cells. This has resulted in a marked improvement in low-resistivity concentrator cell energy conversion efficiency to values in the 23 to 25% range at 50 to 150 suns concentration with values above 20% recorded out to 1,000 suns. Processing requirements for high-resistivity silicon cells have also been explored with 'one-sun' open-circuit voltages in the 630 to 640-mV range demonstrated on both p-type and n-type high-resistivity substrates. The latter n-type substrates are argued to have the better long-term potential from the point of view of fabricating high-efficiency, bifacially contacted cells on such high-resistivity substrates. Light trapping based on both randomizing and geometrical schemes is examined. It is concluded that light trapping is particularly relevant to concentrator cells and may allow 30% module efficiency to be reached using thin silicon cells.

32639 **(SAND—87-7098) Development of a thin AlGaAs solar cell.** (Spire Corp., Bedford, MA (USA); Sandia National Labs., Albuquerque, NM (USA)). Apr 1987. Contract AC04-76DP00789. 94p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE87009357.

The objective of this work was the production of ultrathin 1.7 eV top cells for a mechanical tandem stack with silicon bottom cells. The unique aspect of our work was MOCVD growth of the AlGaAs cell on a germanium substrate, subsequently completely removed by selective etching. Important results include the identification of Ge autodoping and unintentional tandem cell formation (p-n junction formation in the Ge substrate) as materials-related problems. The former was solved by GaAs backside capping of the Ge, and the latter was obviated by substrate removal. A process for bonding to a glass superstrate, substrate removal by etching, and application of a back contact grid was developed. Working solar cells of GaAs and AlGaAs with thicknesses of 5 microns have been demonstrated.

32640 **(SERI/PR—211-3073) Polycrystalline thin films: Annual report FY 1986.** Zweibel, K.; Mitchell, R.; Ullal, H. (Solar Energy Research Inst., Golden, CO (USA)). Feb 1987. Contract AC02-83CH10093. 49p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87001152.

This annual report for fiscal year 1986 summarizes the status, accomplishments, and projected future research directions of the Polycrystalline Thin Film Task in the Photovoltaic Program Branch of the Solar Energy Research Institute's Solar Electric Research Division. Subcontracted work in this area has concentrated on the development of $CuInSe_2$ and CdTe technologies. During FY 1986, major progress was achieved by subcontractors in (1) achieving 10.5% (SERI-verified) efficiency with CdTe, (2) improving the efficiency of selenized $CuInSe_2$ solar cells to nearly 8%, and (3) developing a transparent contact to CdTe cells for potential use in the top cells of tandem structures.

32641 **(SERI/STR—211-3084) Diagnostics of glow discharges used to produce hydrogenated amorphous silicon films: Final subcontract report, 15 April 1985-14 April 1986.** Gallagher, A.; Scott, J. (National Bureau of Standards, Boulder, CO (USA); Colorado Univ., Boulder (USA); Solar Energy Research Inst., Golden, CO (USA)). Dec 1986. Contract AC02-83CH10093. 60p. NTIS MF A01; 2; GPO Dep. File Number DE87001144.

The primary purpose of the research reported here is to discover the microscopic processes responsible for a-Si:H film growth in silane discharges. Such knowledge should help investigators understand the causes of variations in a-Si:H film quality with discharge conditions. The most important pieces of this issue have now been established, and a model has been developed for the discharge gas and surface chemistry. This report summarizes the model for discharge and film growth, including surface reactions and the release of radicals from the growing film surface. This is the most detailed model available for the process of silane discharge chemistry, deposition, and film growth. Deposition rates and photo- and dark conductivities, among others, have been measured for intrinsic a-Si:H films produced under various discharge conditions for a variety of substrate temperatures and other discharge parameters. Measurements were begun of the molecules bonded to growing a-Si:H surface layers to establish the basic characteristics of the growth process and the release of radicals back into the gas. This has been done by post-deposition sputtering. Some critical features of the top surface layers associated with the film growth process have thus been discovered.

32642 **(SERI/STR—211-3097) Research on high-efficiency, single-junction, monolithic, thin-film amorphous silicon solar cells: Annual subcontract report, May 1985 - Jul 1986.** Wiesmann, H.; Dolan, J.; Fricano, G.; Danginis, V. (Vactronic Lab. Equipment, Inc., East Northport, NY (USA); Solar Energy Research Inst., Golden, CO (USA)). Feb 1987. Contract AC02-83CH10093. 89p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE87001146.

A study was undertaken of the optoelectronic properties of amorphous silicon-hydrogen thin films deposited from disilane at

high deposition rates. The information derived from this study was used to fabricate amorphous silicon solar cells with efficiencies exceeding 7%. The intrinsic layer of these solar cells was deposited at 15 angstroms/second. Material properties investigated included dark conductivity, photoconductivity, minority carrier diffusion length, and density of states. The solar cells properties characterized were absolute quantum yield and simulated global AM 1.5 efficiencies. Investigations were undertaken utilizing optical and infrared spectroscopy to optimize the microstructures of the intrinsic amorphous silicon. That work was sponsored by the New York State Energy Research and Development Authority. The information was used to optimize the intrinsic layer of amorphous silicon solar cells, resulting in AM 1.5 efficiencies exceeding 7%.

32643 **(SERI/STR—211-3104) Research on high-efficiency, stacked, multi-junction, amorphous silicon alloy thin-film solar cell: Semiannual subcontract report; 15 October 1985 - 30 April 1986.** Dalal, V. (Spire Corp., Bedford, MA (USA); Solar Energy Research Inst., Golden, CO (USA)). Jan 1987. Contract AC02-83CH10093. 64p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87001142.

This report describes work performed to investigate and develop high-efficiency, multijunction amorphous silicon alloy thin-film solar cells. Specifically, a-Si:H and a-(Si,Ge):H alloys have been deposited and characterized chemically, structurally, optically, and electronically. Also, a-Si:H/a-(Si,Ge):H high-efficiency tandem solar cells have been fabricated and analyzed. In this contract period, a plasma-isolated, two-chamber, hot-wall glow discharge reactor began operating. Good quality a-Si:H layers were grown. A chemical vapor deposition (CVD) pyrolytic reactor for depositing SnO_2:F layers on glass was also used. Single-junction a-Si:H cells up to 9.1% in efficiency were fabricated, as were multijunction a-Si:H/a-(Si,Ge):H cells up to 7.2% in efficiency.

32644 **(SERI/STR—211-3105) Research on semiconductors for high-efficiency solar cells: Annual subcontract report, 1 September 1985-31 August 1986.** Borrego, J.M.; Ghandhi, S.K. (Rensselaer Polytechnic Inst., Troy, NY (USA); Solar Energy Research Inst., Golden, CO (USA)). Mar 1987. Contract AC02-83CH10093. 53p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87001157.

This report describes the first year's work on studies involving the fabrication of large-area, high-efficiency solar cells. The work was subdivided into five tasks: the development of computer models for organometallic vapor phase epitaxial (OMVPE) growth; the in situ diagnostics of reactant species under growth conditions; the study of mismatched systems, with emphasis on GaAs-Si; the use of photoluminescence techniques for determining the bulk lifetime in GaAs; and the use of microwave diagnostics for semiconductors. Progress in each task is outlined, together with plans for the future.

32645 **(SERI/STR—211-3107) Amorphous hydrogenerated silicon germanium alloys suitable for photoelectronic applications: Annual subcontract report, 1 July 1985-30 June 1986.** Paul, W.; Mackenzie, K.D. (Harvard Univ., Cambridge, MA (USA). Div. of Applied Sciences; Solar Energy Research Inst., Golden, CO (USA)). Jan 1987. Contract AC02-83CH10093. 58p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87001143.

This report covers the second year of a two-year project to produce amorphous silicon-germanium alloys from mixtures of hydrides and from mixtures of fluorides and to compare the photoelectronic properties of the two preparations. In the first year we successfully prepared these alloys by both methods, with a range of compositions adequate to provide the low-band-gap material desired in tandem solar cells. We also measured infrared vibrational absorption, optical absorption edge spectra, photoconductivity spectra, photoluminescence spectra, and conductivity versus temperature. In the second year we made more extensive measurements, on a wider variety of samples, of all of those properties. We also obtained measurements by the time-of-flight technique to obtain electron $\mu\tau$au products, and we measured the sub-band-gap absorption by the constant photocurrent method. The report also includes collaborative measurements of the dangling bond densities from electron spin resonance and preliminary measurements of the gap-state densities estimated from measurements of the space-charge-limited current.

32646 **(SERI/STR—211-3114) Photochemical vapor deposition of amorphous silicon photovoltaic devices: Annual subcontract report, 1 May 1985-30 April 1986.** Baron, B.N.; Rocheleau, R.E.; Hegedus, S.S. (Delaware Univ., Newark (USA). Inst. of Energy Conversion; Solar Energy Research Inst., Golden, CO (USA)). Feb 1987. Contract AC02-83CH10093. 56p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87001145.

Intrinsic, p-type, and n-type a-Si:H and p-type a-SiC:H thin-films have been deposited by Hg-sensitized photochemical vapor depositions (photo-CVD) from disilane. The photochemical reactor design includes two chambers separated by a movable uv-transparent Teflon curtain, which eliminates deposition on the reactor window. Photovoltaic devices of the type glass/TCO/p-i-n/metal were fabricated by photo-CVD. The device efficiency obtained at 87.5 mW/cm^2 and ELH illumination was 6.4%.

32647 **Optics and calculated efficiencies of mechanically stacked two-junction solar cells.** Partain, L.D.; Fraas, L.M.; McLeod, P.S.; Cape, J.A.; Kuryla, M.S. (Chevron Research Company, Richmond, California 94802). *Journal of Applied Physics;* **62**: No. 2, 694-699(15 Jul 1987).

Mechanically stacked two-junction solar cells avoid the multijunction problems of interfering growth conditions, shorting layers, and current matching. They also allow the use of well-developed Si and GaAs junctions. Doping the top junction substrates at $2(10^{17})$ cm^{-3} reduces measured free-carrier absorption by up to a factor of 5 compared to doping at $8(10^{17})$ cm^{-3}. Separately measured quantum-yield spectra, open-circuit voltages, and fill factors provide the basis to calculate stack efficiencies of 24%—28% for Si stacked under GaAsP and GaAs top junctions for a direct air mass 1.5 (AM1.5D)= terrestrial sunlight spectra and a 400 x light concentration. The GaAs is a preferred top junction because it has a direct gap, operates at near its theoretical limits, and minimizes transmission loss effects by contributing over 70% of the total stack output without compromising potential stack performance. The open-circuit voltages of GaAs and Si cells are measured to vary with light intensity as predicted by the standard model with a junction ideality factor equal to 1.0. This and other experimental junction data provide the basis to calculate 400 x , AM1.5D stack efficiencies of 29% for GaAs stacked on Ge and 30% for GaAs stacked on GaSb. Device improvements are suggested to project GaAs/Ge stack efficiencies of 30% and GaAs/GaSb stack efficiencies of 34% for 400 x , AM1.5D. The 400 x , AM0 efficiencies for space are 0.88 to 0.91 times the corresponding, terrestrial AM1.5D values.

32648 **Photovoltaics and Insolation Measurements Workshop, Vail, CO, June 30-July 3, 1985, Proceedings.** *Solar Cells;* **18**: 226(Oct 1986). (CONF-8506237—).

From Photovoltaics and insolation measurements workshop; Vail, CO, USA (30 Jun 1985).

Measurement methods and models are described for quantifying the ambient insolation and performance characteristics of solar cells, from new cell designs to installed arrays. Particular attention is given to characterizing the performance of a-Si:H solar cells and the overall performance of arrays of cell modules. Factors which adversely influence the performance of individual cells and cell arrays are identified.

32649 **Current status of photovoltaic research at SERI.** Deb, S.K. (Solar Energy Research Institute, Golden, CO 80401). pp 44-57 of Materials and optics for solar energy conversion and advanced lighting technology. Lampert, C.M.; Holly, S. Bellingham, WA; SPIE Society of Photo-Optical Instrumentation Engineers (1986). (CONF-860880—).

From 30. SPIE technical symposium on optics and optoelectronic engineering; San Diego, CA, USA (17 Aug 1986).

The purpose of SERI's Photovoltaic Program is to conduct high risk, potentially high payoff research and development which will result in a scientific and technical knowledge base which pri-

vate enterprise can use for further concept and product development and, ultimately, competitive application in electrical energy markets. Consistent with this strategy, a multiple research approach that ensures greater probability of success has been developed. In this paper the authors review the current status of research and development in a few leading technologies such as amorphous silicon, polycrystalline thin films based on CuInSe/sub 2/ and CdTe, high efficiency solar cells using III-V compounds and their alloys, and high efficiency crystalline silicon.

1406 Photovoltaic Power Systems

REFER ALSO TO CITATION(S) 32667

32650 **(N—87-17398) Lunar power systems. Final report.** (System Development Corp., Camarillo, CA (USA)). Dec 1986. 324p. (NASA-CR—171956; NAS—1.26:171956). NTIS, PC A14/MF A01.

The findings of a study on the feasibility of several methods of providing electrical power for a permanently manned lunar base are provided. Two fundamentally different methods for lunar electrical power generation are considered. One is the use of a small nuclear reactor and the other is the conversion of solar energy to electricity. The baseline goal was to initially provide 300 kW of power with growth capability to one megawatt and eventually to 10 megawatts. A detailed, day by day scenario for the establishment, build-up, and operational activity of the lunar base is presented. Also presented is a conceptual approach to a supporting transportation system which identifies the number, type, and deployment of transportation vehicles required to support the base. An approach to the use of solar cells in the lunar environment was developed. There are a number of heat engines which are applicable to solar/electric conversions, and these are examined. Several approaches to energy storage which were used by the electric power utilities were examined and those which could be used at a lunar base were identified.

32651 (N—87-20055, pp vp) **High voltage system: plasma interaction summary.** Stevens, N.J. Oct 1986. NTIS, PC A20/MF A01. (NASA-CR—180231; JPL-PUB—86-49; NAS—1.26:180231; CONF-8609284—).

From Workshop on space technology plasma issues in 2001; Pasadena, CA, USA (24 Sep 1986).

The possible interactions that could exist between a high voltage system and the space plasma environment are reviewed. A solar array is used as an example of such a system. The emphasis in this review is on the discrepancies that exist in this technology in both flight and ground experiment data. It has been found that, in ground testing, there are facility effects, cell size effects and area scaling uncertainties. For space applications there are area scaling and discharge concerns for an array as well as the influence of the large space structures on the collection process. There are still considerable uncertainties in the high voltage-space plasma interaction technology even after several years of effort.

32652 **(SAND—87-1113C) Photovoltaic water pumping for Bolivia.** Post, H.N.; Garvison, P. (Sandia National Labs., Albuquerque, NM (USA); Solarex Corp., Rockville, MD (USA)). 1987. 13p. (CONF-870528—16). NTIS, PC A02/MF A01. File Number DE87008967.

From 19. IEEE photovoltaic specialists conference; New Orleans, LA, USA (4 May 1987).

This paper describes the design, installation and performance of photovoltaically-powered water pumping systems which provide potable water to residents of three villages in the Altiplano region of Bolivia. The installation of these systems during August 1986 was the culmination of a cooperative effort between The World Bank, US Department of Energy and the Bolivian government. This project was configured to demonstrate, through pilot systems, the many potential benefits of using photovoltaic water pumping in developing countries. The lessons learned through the procurement and installation of these systems are discussed and the resulting benefits of the project to international lending institutions, US industry, and the Bolivian participants are examined.

32653 **The photovoltaic industry.** (U.S. Dept. of Energy). pp 173-184 of The handbook of photovoltaic applications. Williams, A.F. New York, NY; Garland Publishing Inc. (1986).

This paper includes a list of manufacturers and their products compiled by the U.S. Department of Energy.

32654 **Determining the economic feasibility of residential systems.** Jones, G.J. (Sandia National Labs., Albuquerque, NM). pp 91-112 of The handbook of photovoltaic applications. Williams, A.F. New York, NY; Garland Publishing Inc. (1986).

Methods are presented for determining the economic feasibility of any proposed photovoltaic system before developing a detailed design. The approach is based on an examination of the physical, legal, operational and economic characteristics that separate promising applications for residential photovoltaic systems from those applications that are not suitable.

32655 **Understanding subsystems in photovoltaic power systems.** Jones, G.J.; Sutton, P.D. (Sandia National Labs., Albuquerque, NM). pp 7-18 of The handbook of photovoltaic applications. Williams, A.F. New York, NY; Garland Publishing Inc. (1986).

This chapter discusses the subcomponents of a photovoltaic system: the collector, the array field and the power conditioner. Then, the interconnection of these elements is discussed, including the impact of each on system efficiency and output.

1407 Solar Thermal Power Systems

REFER ALSO TO CITATION(S) 32650, 32660

32656 **(SAND—86-7042) Development and fabrication of a two-axis tracking structure and baseline module improvement.** Sanders, J.A.; Cass, D.C. (Intersol Power Corp., Lakewood, CO (USA)). Mar 1987. Contract AC04-76DP00789. 88p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE87007952.

The design improvement objectives of this project were to further enhance the performance and reduce cost of the second-generation low-profile point-focus Fresnel lens concentrator. The primary objective was to redesign a two-axis drive mechanism and structure that overcomes the failure modes of the first-generation design and increases collector aperture area without detriment to performance. A secondary objective was to develop secondary optics and grid obscuration techniques to improve module electrical performance and increase tracking error tolerance. The drive mechanism and structure design resulted in a significant reduction in the number of parts and improved structural integrity. The tracking structure is capable of supporting 70 square meters of flat-plate modules and 41 square meters of second-generation point-focus Fresnel lens modules. A total internal reflector (TIR) with cell grid obscuration grooves was designed. The TIR had superior offtracking performance over secondary reflectors but, without grid obscuration, was unable to achieve operating efficiencies equal to the earlier designs. Grid obscuration designs were evolved and proof of concept established. Further development is necessary to evaluate the actual application of grid obscuration techniques under high concentration.

32657 **(SAND—86-8060) SOLERGY; A computer code for calculating the annual energy from central receiver power plants.** Stoddard, M.C.; Faas, S.E.; Chiang, C.J.; Dirks, J.A. (Sandia National Labs., Livermore, CA (USA); Sandia National Labs., Albuquerque, NM (USA); Pacific Northwest Lab., Richland, WA (USA)). May 1987. Contract AC04-76DR00789. 144p. NTIS, PC A07/MF A01; 1; GPO Dep. File Number DE87009804.

The program SOLERGY was designed to simulate the operation and power output of a user-defined solar central receiver power plant for a time period of up to one year. SOLERGY utilizes recorded or simulated weather data and plant component performance models to calculate the power flowing through each part

of the solar plant. A plant control subroutine monitors these powers and determines when to operate the various plant subsystems. Parasitic electrical power is computed on a 24-hour basis.

32658 **(SAND—87-8177-Vol.3) Solar fuels and chemicals system design study - production and regeneration of activated carbon: Final report: Volume 3, Appendices.** (Babcock and Wilcox Co., Barberton, OH (USA). Nuclear Equipment Div.; Sandia National Labs., Livermore, CA (USA)). Mar 1987. Contract AC04-76DR00789. 184p. NTIS, PC A09. File Number DE87009377.

This report describes the conceptual design of a solar thermal central receiver system that both produces activated carbon from coal and regenerates spent activated carbon. The system design uses molten carbonate salt that is heated in the receiver to transfer heat to an activated carbon plant located near the base of the receiver tower. Capital and operating cost estimates are described, and market and economic analyses are presented to assess the attractiveness of the proposed system. Technical uncertainties are identified as the basis for a development plan to bring the proposed system to maturity.

1409 Solar Thermal Utilization

REFER ALSO TO CITATION(S) 33062, 33089

32659 (DOE/CE/27460—T9, pp E.266-E.279) **Monitored energy use of residential water heaters.** Usibelli, A. (Lawrence Berkeley Lab., CA). Aug 1984. American Council for an Energy-Efficient Economy, 1001 Connecticut Ave., NW, Suite 535, Washington, DC 20036. File Number TI87005138. Contract AC03-76SF00098.

In Doing better: setting an agenda for the second decade: Volume E. Proceedings from the panel on appliances and equipment.

Water heating represents the second largest end-use of energy in the residential sector. Although there is much theoretical and laboratory analysis of water heater performance there are relatively few comprehensive measurements of actual field performance. This paper describes and analyzes both laboratory and field test data on water heaters, from more than 75 published and unpublished sources, principally in the US. The compilation contains data on baseline energy and hot water usage patterns, a variety of conservation and solar measures, and new high-efficiency water heaters. Measured data show that thermal traps (anti-convection valves) often save as much energy as insulating blankets, however, there is a wide range of variability in performance. Heat pump water heaters generally exhibit seasonal COPs around 2.0, but installation and location can also affect performance. Similar, although more pronounced, variation in performance is exhibited by solar water heating systems. The data base compilation also highlights the many gaps in data quality and availability, particularly concerning in-place system performance, outlines steps needed to fill these gaps, and discusses the difficulty of developing standardized performance criteria (especially for solar systems). 11 references, 10 tables.

32660 **(SAND—85-2316-Rev.) Acurex Solar Corporation Modular Industrial Solar Retrofit qualification test results.** Cameron, C.P.; Dudley, V.E. (Sandia National Labs., Albuquerque, NM (USA); EG and G/Washington Analytical Services Center, Inc., Albuquerque, NM (USA)). Apr 1987. Contract AC04-76DP00789. 87p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE87009978.

Under the Department of Energy's Modular Industrial Solar Retrofit project, industrial process steam systems incorporating line-focus solar thermal collectors were designed and hardware was installed and tested. This report describes the test results for the system designed by Acurex Solar Corporation. The test series included function and safety tests to determine that the system operated as specified, an unattended operations test to demonstrate automatic operation, performance tests to provide a database for predicting system performance, and life cycle tests to evaluate component and maintenance requirements. Component-level modifications to improve system performance and reliability were also evaluated.

32661 **Thermochromic materials research for optical switching.** Lee, J.C.; Jorgenson, G.V.; Lin, R.J. (Honeywell Systems and Research Center, PO Box 1361, Minneapolis, MN 55440). pp 2-7 of Materials and optics for solar energy conversion and advanced lighting technology. Lampert, C.M.; Holly, S. Bellingham, WA; SPIE Society of Photo-Optical Instrumentation Engineers (1986). (CONF-860880—).

From 30. SPIE technical symposium on optics and optoelectronic engineering; San Diego, CA, USA (17 Aug 1986).

Reactive-ion-beam-sputtering (RIBS) is used to deposit doped vanadium dioxide (V/sub 1-x/M/sub x/O/sub 2/), where M is a dopant that lowers the transition temperature (T/sub t/) from that of stoichiometric VO/sub 2/. The objective is to synthesize a material that will passively switch between a heat-transmitting-and a heat-reflecting-state at specific design temperatures in the human comfort range. The films are deposited at elevated temperature (>700K) onto glass and sapphire substrates for spectrophotometric evaluation above and below T/sub t/. Then by analyzing the deposited films via EDAX, correlations between film composition and passive solar switching performance are made. Also concepts for synthesizing suitable crystallites of such materials are described. These crystallites could act as switchable pigments for throchromic solar paint.

32662 **Lessons learned from the BPA solar homebuilders program.** Mc Kinstry, M.; Lambert, L. (Bonneville Power Administration). pp B172-B182 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

From October 1982 through September 1983, 16 new, energy-efficient solar homes were monitored by BPA for thermal performance. The homes were located in Portland, oregon, and Spokane, Washington. Use was made of the Class B passive solar monitoring methodology, as developed by the Solar Energy Research Institute. Results are presented, including: 1) monthly energy balances for the homes (and system efficiencies derived from their balances); 2) comparison between measured and design tool predicted performance; and 3) design recommendations regarding thermal mass, air handling, etc., developed from analysis of the monthly and hourly data.

32663 **Measured heating performance of new, low-energy homes: Updated results from the BECA-A database.** Busch, J.F.; Meier, A.K.; Nagpal, T.S. (Lawrence Berkeley Lab.). pp B14-B28 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—). Contract AC03-76SF00098.

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

The authors have compiled heating performance data on 319 single-family, multifamily, and manufactured low-energy houses in the United States, Canada, and Northern Europe. Where possible, they standardized the house's measured furnace consumption for variations in internal gains and indoor temperature. They calculated several indicators of thermal performance, among them a k-value and balance temperature. The houses had an average k-value of 188 Watts/°C and balance temperature of 13°C. They found these houses had annual furnace outputs considerably less than that required for houses being built with current practice. For buildings with incremental conservation construction costs, they compared their cost-effectiveness and found that homes with superinsulation had the lowest cost of conserved energy, followed by passive and active solar. They continue to increase the number of homes in the database.

32664 Monitored energy use of residential water heaters - Buildings energy-use compilation and analysis: Part D. Usibelli, A. (Lawrence Berkeley Lab.). pp E266-E279 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—). Contract AC03-76SF00098.

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

This paper describes and analyzes both laboratory and field test data on water heaters, from more than 75 published and unpublished sources, principally in the U.S. The compilation contains data on baseline energy and hot water usage patterns, a variety of conservation and solar measures, and new high-efficiency water heaters. Measured data show that thermal traps (anti-convection valves) often save as much energy as insulating blankets, however, there is a wide range of variability in performance. Heat pump water heaters generally exhibit seasonal COPs around 2.0, but installation and location can also affect performance. Similar, although more pronounced, variation in performance is exhibited by solar water heating systems. The data base compilation also highlights the many gaps in data quality and availability.

32665 HVAC and water heating system field test experiences at the Tennessee Energy Conservation in Housing (TECH) complex. Baxter, V.D.; Mc Graw, B.A. (Energy Div., Oak Ridge National Lab.). pp E18-E37 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—). Contract AC05-84OR21400.

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

The TECH complex has been utilized since 1976 as a field test site for several novel and conventional space conditioning and water heating systems. Systems tested include the Annual Cycle Energy System (ACES), solar space heating systems (hydronic and air), parallel and series solar assisted heat pumps, air-type solar heating with off-peak storage, passive solar heating, two conventional air-to-air heat pumps, an air-to-air heat pump with desuperheater water heater, and horizontal coil and multiple shallow vertical coil ground-coupled heat pumps. System descriptions and test results are presented as well as performance observations.

32666 Passive solar/earth sheltered office/dormitory cooling season thermal performance. Christian, J. (Energy Div., Oak Ridge National Lab.). pp D180-D192 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—). Contract AC05-84OR21400.

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

Continuous detailed hourly thermal performance measurements have been taken since February 1982 in and around an occupied, underground, 4000 ft/sup 2/ office/dormitory building at the Oak Ridge National Laboratory in Oak Ridge, Tennessee. This building has a number of energy saving features which have been analyzed relative to their performance in a southeastern U.S. climate and with respect to overall commercial building performance. This analysis documents cooling season performance, as well as effects of earth contact, interior thermal mass, an economizer cycle and interface of an efficient building envelope with a central three-ton heat pump.

1410 Solar Collectors And Concentrators

REFER ALSO TO CITATION(S) 32655

32667 Photovoltaic concentrators and advanced cell technology. Edenburn, M.W.; Boes, E.C. (Sandia National Labs., Albuquerque, NM). pp 33-50 of The handbook of photovoltaic applications. Williams, A.F. New York, NY; Garland Publishing Inc. (1986).

Advances in photovoltaic concentrator technology have drawn interest to their applications. Concentrator lens array fields installed several years ago have all demonstrated good electrical performance with little degradation. The various types of concentrators are illustrated, as well as advanced concentrator and system economics.

32668 Exposure testing of solar absorber surfaces. Moore, S.W. (Los Alamos National Lab., MS-J577, P.O. Box 1663, Los Alamos, NM 87545). pp 126-135 of Materials and optics for solar energy conversion and advanced lighting technology. Lampert, C.M.; Holly, S. Bellingham, WA; SPIE Society of Photo-Optical Instrumentation Engineers (1986). (CONF-860880—).

From 30. SPIE technical symposium on optics and optoelectronic engineering; San Diego, CA, USA (17 Aug 1986).

The Los Alamos National Laboratory has been involved in supporting, monitoring and conducting exposure testing of solar materials for approximately ten years. The Laboratory has provided technical monitoring of the IITRI, DSET, Lockheed, and Berry contracts and has operated the Los Alamos exposure Facility for over five years. This report outlines some of the past exposure testing, the testing still in progress, and describe some of the major findings. While this report primarily emphasizes solar absorber surfaces, some of the significant findings relative to advanced glazing are discussed.

32669 Specular reflectance properties of silvered polymer materials. Susemihl, I.; Schissel, P. (Solar Energy Research Institute, 1617 Cole Boulevard, Golden, CO 80401). pp 102-111 of Materials and optics for solar energy conversion and advanced lighting technology. Lampert, C.M.; Holly, S. Bellingham, WA; SPIE Society of Photo-Optical Instrumentation Engineers (1986). (CONF-860880—). Contract AC02-83CH10093.

From 30. SPIE technical symposium on optics and optoelectronic engineering; San Diego, CA, USA (17 Aug 1986).

The specular reflection properties of transparent cast polymer sheets and extruded polymer films, silvered and unsilvered, have been characterized with a newly designed specular reflectometer. The results obtained with this instrument are either absolute reflectances or a measure for the Fourier transform of the reflection function of the specimen in one dimension. Cast polymer sheets are investigated before and after silvering, and silvered polymer films are evaluated by mounting them with an adhesive onto aluminum or glass substrates, or by suspending the thin, silvered polymer as a taut membrane. Silvered polymers have attained a specularity such that over 90% of the incident beam is contained in a 1-2 mrad full-cone angle when mounted on a good substrate or suspended as a membrane. This value is well within the current goals for solar concentrators but silvered polymer mirrors are currently less specular than glass mirrors.

32670 Design considerations for long-lived glass mirrors for space. Bouquet, F.L.; Maag, C.R.; Heggen, P.M. (Applied Technologies Section, Jet Propulsion Lab., California Institute of Technology, Pasadena, CA 91109). pp 94-101 of Materials and optics for solar energy conversion and advanced lighting technology. Lampert, C.M.; Holly, S. Bellingham, WA; SPIE Society of Photo-Optical Instrumentation Engineers (1986). (CONF-860880—).

From 30. SPIE technical symposium on optics and optoelectronic engineering; San Diego, CA, USA (17 Aug 1986).

Experience from the solar terrestrial glass mirrors can be applied to the design for use in space. In this paper, a brief review of terrestrial experience, space flight tests of glass mirrors, and future

design considerations for long-lived mirrors is given. Topics considered include solar concentrators, mirrors, glass forecasting, performance, space vehicle components, optical properties, and testing.

32671 **Holographic solar concentrator.** Hull, J.L.; Lauer, J.P.; Broadbent, D.C. (Environmental Systems Div., Acurex Corp., 485 Clyde Avenue, Mountain View, CA 94039). pp 68-74 of Materials and optics for solar energy conversion and advanced lighting technology. Lampert, C.M.; Holly, S. Bellingham, WA; SPIE Society of Photo-Optical Instrumentation Engineers (1986). (CONF-860880—).

From 30. SPIE technical symposium on optics and optoelectronic engineering; San Diego, CA, USA (17 Aug 1986).

The approach selected is the fabrication of holographic optical elements, which will focus sunlight to either a line or a point. A concentrating mirror is replicated in the hologram which consists of dichromate gelatin exposed to a laser beam. The dichromate gelatin can be processed to produce a nonuniform microstructure, which gives the hologram a significant waveband width. Even so, it becomes necessary to stack at least three holograms, with each hologram reflecting a different region of the solar spectrum, if we are to reflect most of the solar energy. To achieve high efficiency, it is necessary to obtain adjacent quasi-square waves for the efficiency-wavelength profile of each of the holograms in the stack. Profile information was obtained by the use of a monochromator coupled to a computer. An optical efficiency in excess of 50 percent was measured for a three hologram stack.

1420 Heat Storage

REFER ALSO TO CITATION(S) 32657

15 GEOTHERMAL ENERGY

1501 Resource Status And Assessment

32672 **(DOE/ID/12607—T1) Geothermal modeling of Jackson Hole, Teton County Wyoming: Final report.** Heasler, H.P. (Wyoming Univ., Laramie (USA). Dept. of Geology and Geophysics). Apr 1987. Contract FG07-85ID12607. 38p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87010181.

This study investigated the possibility of high-temperature-heat sources (greater than 300°C) in the area of Jackson Hole, northwestern Wyoming. Analytical and finite-difference numerical models describing conductive and convective terrestrial heat transport were utilized in an attempt to define the thermal regime of this area. This report presents data which were used as constraints for the analytic and numerical thermal models. These data include a general discussion of geology of the area, thermal spring information, subsurface temperature information, and hydrology of the area. Model results are presented with a discussion of interpretations and implications for the existence of high-temperature heat sources in the Jackson Hole area.

32673 **(SAND—87-1253C) Magma energy.** Dunn, J.C. (Sandia National Labs., Albuquerque, NM (USA)). 1987. Contract AC04-76DP00789. 5p. (CONF-8704110—7). NTIS, PC A02. File Number DE87009834.

From 5. geothermal program review; Washington, DC, USA (14 Apr 1987).

The thermal energy contained in magmatic systems represents a huge potential resource. In the US, useful energy contained in molten and partially-molten magma within the upper 10 km of the crust has been estimated at 5 to 50 x 10^{22} J (50,000 to 500,000 Quads). The objective of the Magma Energy Extraction Program is to determine the engineering feasibility of locating, accessing, and utilizing magma as a viable energy resource. This program follows the DOE/OBES-funded Magma Energy Research Project that concluded scientific feasibility of the magma energy concept. A primary long-range goal of this program is to conduct an energy extraction experiment directly in a molten, crustal magma body. Critical to determining engineering feasibility are several key technology tasks: (1) Geophysics - to obtain detailed definition of potential magma targets, (2) Geochemistry/Materials - to characterize the magma environment and select compatible engineering materials, (3) Drilling - to develop drilling and completion techniques for entry into a magma body, and (4) Energy Extraction - to develop heat extraction technology.

1502 Geology And Hydrology Of Geothermal Systems

REFER ALSO TO CITATION(S) 32679, 32680, 32681, 33956, 33957, 33959

32674 (CONF-850442—Summs., pp 6-7) **Hydrothermal systems: research drilling opportunities in the Creede mining district, Colorado.** Bethke, P.M. (Geological Survey, Reston, VA). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

A program of scientific drilling in the Ag-Pb-Zn-Cu Creede district presents an exceptional opportunity to establish, for the first time, the physical connection between the epithermal ores deposited along the top of a deeply circulating hydrothermal system and the roots of that system. Although many epithermal ore deposits and the roots of many hydrothermal systems have been studied comprehensively in both surface and underground exposure, each environment is diverse in its characteristics, and the high degree of speculation concerning the connections between specific types of root zones and specific types of epithermal ores perpetuates a century-old controversy. The establishment of such a connection in at least one system is required in order to use the advanced knowledge of each environment, together with comparisons to modern geothermal systems, to develop a comprehensive, quantitative model of a complete and representative ore-forming hydrothermal system. The development of such a total-system model critically important to their understanding of hydrothermal ore-forming systems, and is equally applicable to their understanding of active geothermal systems. This paper reviews this research.

32675 (CONF-850442—Summs., pp 9-11) **Proposal for a six kilometer drill hole in the eastern Arbuckle Mountains, Oklahoma, the Spavinaw Creek area, Oklahoma, or the St. Francois Mountains, Missouri.** Bickford, M.E. (Univ. of Kansas, Lawrence). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

The best site for the proposed drill hole would be where there is the greatest likelihood of penetrating the silicic rocks and sampling older crust beneath. In most of the region the basement is overlain by one to three kilometers of Phanerozoic sedimentary rocks. Because these rocks constitute a major part of the continent, and because their origin is of major importance in deducing the tectonic history of the continent, the model presented in this test should be tested. The ultimate test is to drill through the inferred veneer of rhyolite and shallow granite. In this way the nature of the transition could be observed, the thickness of the granite-rhyolite veneer could be determined, and samples of the older crust could be obtained for age determination, isotopic analysis (Sm-Nd, common Pb, Rb-Sr), and chemical analysis.

32676 (CONF-850442—Summs., pp 13-14) **Instrumenting continental drill holes in the Alaska peninsula.** Bond, G.; Lewis, S.; Christie-Blick, N.; Diebold, J.; Jacob, K.; Kominz, M.; Steckler, M.; Scholl, D.; Von Huene, R.; Cooper, A.; Bruns, T. 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

The Alaska Peninsula belongs to a category of island arc-trench systems that have a fundamental role in the accretionary growth of continents and formation of continental crust. In spite of the importance of these systems, little is known of their uplift and subsidence history, thermal evolution, distribution of stress and crustal structure. The Peninsula offers unusual opportunities to incorporate continental drilling in a program of research to address

these problems in one of the largest areas of accretionary tectonics in the world.

32677 (CONF-850442—Summs., pp 34-36) **Deep observation of continental crust and fossil hydrothermal systems at Yerington, Nevada, and Red Mountain, Arizona.** Einaudi, M.T.; Bird, D.K.; Miller, E.L.; Brimhall, G.H.; Dietrich, W.E.; Ohmoto, H.; Burnham, C.W.; Furlong, K.P.; Barton, M.D.; De Paolo, D.J.; Bodnar, R.J. (Stanford Univ., CA). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

Past studies of porphyry Cu-Mo systems, limited to crustal blocks on the scale of 1 or 2 km, have emphasized the highly anomalous ore zones and have identified their common alteration-mineralization features and deduced the general physiochemical environment and sources of hydrothermal fluids. However, in order to model the overall processes of heat and mass transport related to large magma-hydrothermal systems and to investigate their potential links with near-surface epithermal precious metal deposits, an interdisciplinary effort must be launched at a scale of crustal observation that is 5-10 km in vertical and horizontal dimension. The authors have identified two field sites that are ideally suited for such studies: Yerington and Red Mountain.

32678 (CONF-850442—Summs., pp 51-52) **Investigation of magma-hydrothermal systems: CSDP proposal for the Valles Caldera, New Mexico.** Goff, F.; Nielson, D.; Wollenberg, H. (Los Alamos National Lab., NM). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

Valles caldera in northern New Mexico is considered by many scientists to be the world's type resurgent caldera and is presently the most thoroughly studied of the three major young caldera complexes in the US. Formation of the caldera and its associated post-caldera eruptives (1.09 to 0.13 Ma) represent the culminating episode of volcanism in the Jemez volcanic field which has been continuously active during the last 13 Ma. A 240 to 300{C neutral chloride hydrothermal system characterized by meteoric recharge, a vapor cap, and lateral outflow presently circulates beneath the resurgent dome. The understanding of caldera processes demonstrated in this magma-hydrothermal system are critical for the effective development of hydrothermal, hot dry rock, and magma energy resources. Hydrothermally altered rocks and mineral concentrations associated with the Valles are recent analogs of the epithermal mineral deposits mined from exhumed calderas. The Valles CSDP is designed to investigated the roots of a classic caldera-type magma-hydrothermal system, its energy budget, and associated tectonic and ore deposit environments. It will provide a natural laboratory for the testing and calibration of surface and borehole geophysical techniques. It will lead to improvement of geological and geochemical models of magma-hydrothermal systems and it will generate technological advances in drilling procedures in high-temperature environments.

1503 Geothermal Exploration And Exploration Technology

REFER ALSO TO CITATION(S) 32675, 32676, 33987

32679 (CONF-850442—Summs., pp 38-39) **Salton Sea scientific drilling project (SSSDP) status report, April 1985.** Elders, W.A. (Univ. of California, Riverside). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

The purpose of this paper is to review the scientific goals, the plans, and achievements of the project to date. The original concept has been modified to drilling and coring a dedicated well to a depth of 3.1 km, some 4 km closer to the center of the hydrothermal zone. They anticipate reaching a temperature of 300°C at a depth of about 1.3 km at this new site. Because current estimates of the cost of this new plan exceed the funds available, they have provisionally reduced the scope of work by, among other things, eliminating the cost of drilling a disposal well. Although this would limit the opportunity for brine sampling and reservoir testing, it still permits a minimally acceptable scientific program. They are therefore proceeding with this plan and expect drilling to begin in July 1985. At the same time the authors are also exploring sources of additional funds to permit a more extensive program of testing and sampling which a disposal well would make possible.

32680 (CONF-850442—Summs., pp 41-42) **Deep continental scientific drilling in Yellowstone National Park.** Fournier, R.O. (Geological Survey, Menlo Park, CA). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

A major objective of drilling at Yellowstone would be to investigate the transition from seismic to aseismic conditions that occurs about 3 to 4 km beneath the caldera. Drilling to 5 km at Yellowstone would provide information about the following processes and how they relate to ore deposition: change in mode of rock deformation from brittle fracture to quasi-plastic flow, mechanisms of heat transfer in coupled hydrothermal-magma systems, limiting factors of meteoric water circulation, evolution of fluids in crystallizing magmas, flux of rare gases from the mantle, and formation of brines at high temperatures and moderate to low pressures. Drilling also would provide information about rock and fluid properties at depth, require to improve caldera-wide models. Core drilling the entire hole would be necessary to achieve many of the above objectives. A specific drill site has not been chosen, but several sites have been identified within the Yellowstone caldera that should satisfy the scientific objectives, while remaining within the political, social, and environmental constraints.

32681 (CONF-850442—Summs., pp 44-45) **Navy Geothermal/GEOTEC Energy R & D program drilling plans.** 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

The US Navy, under the Navy Energy R & D Program, is actively developing plans for scientific drilling projects on the island of Adak in the Aleutian Arc and the island of Oahu in the Hawaiian island chain. The Navy hopes that the results of these drilling programs will provide needed information on the geothermal resources beneath these islands and the applicability of using geothermal fluids to provide power and space heating to Naval installations located on those islands. The Navy believes that if the fluid temperatures are greater than 180°C and of sufficient quality and quantity then direct use of the fluids for power production is possible; if the fluids are of moderate temperature (between 120°C and 180°C) and of sufficient quantity then the use of the Geothermal/Ocean Thermal Energy Conversion (GEOTEC) concept for the production of power is a viable geothermal utilization concept. GEOTEC uses the geothermal fluids for the topping cycle and the cold ocean water as the bottoming cycle using OTEC technology. Value from the drill holes for the scientific community is presented.

32682 **(LBL—23116) A core hole in the southwestern moat of the Long Valley caldera: Early results.** Wollenberg, H.A.; Sorey, M.L.; Farrar, C.D.; White, A.F.; Flexser, S.; Bartel, L.C. (Lawrence Berkeley Lab., CA (USA)). Dec 1986. 22p. (CONF-861220—6). NTIS, PC A02/MF A01; GPO Dep. File Number DE87009633.

From American Geophysical Union fall meeting; San Francisco, CA, USA (8 Dec 1986).

A continuously cored hole penetrated 715m into the southwestern moat of the Long Valley caldera. Temperatures in the post-caldera deposits increase rapidly with depth over the upper 335m to 202°C, then remain nearly isothermal into the Bishop Tuff to the bottom of the hole. The depth to the Bishop is the shallowest, and the temperatures observed are among the highest in holes drilled in the caldera. The hole identifies a potential geothermal resource for the community of Mammoth Lakes, constrains the position of the principal heat source for the caldera's hydrothermal system, and serves as access for monitoring changes in water level, temperatures, and fluid chemistry.

1506 Environmental Aspects And Waste Disposal

REFER ALSO TO CITATION(S) 33764

32683 **(LBL—23230) Brine injection studies at Lawrence Berkeley Laboratory.** Lippmann, M.J. (Lawrence Berkeley Lab., CA (USA)). 1987. Contract AC03-76SF00098. 6p. (CONF-8704110—4). NTIS, PC A02. File Number DE87009619.

From 5. geothermal program review; Washington, DC, USA (14 Apr 1987).

As an integral part of DOE/GTD's Brine Injection Program, LBL is developing and demonstrating methods for: (1) designing and analyzing injection tests, (2) predicting and monitoring migration of injected fluids, and (3) optimizing field-wide injection and heat extraction operations in geothermal reservoirs. Computational and well test techniques are being developed (a) to detect and predict the movement of fluids of contrasting temperatures, phase compositions and chemistries in the injected formation, and (b) to characterize the associated physical and chemical processes occurring in the reservoir. LBL's theoretical and field-related brine injection activities in FY 1986 are described, and progress made during FY 1987 is discussed.

1508 Geothermal Power Plants

REFER ALSO TO CITATION(S) 32685

32684 **(EPRI-AP—5134-Vol.1) Simulator-analyzer for binary-cycle geothermal power plants: Volume 1, Executive summary: Final report.** Greenlee, T.L. (ESSCOR, Solano Beach, CA (USA); Electric Power Research Inst., Palo Alto, CA (USA)). Apr 1987. 60p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920404.

The object was to develop a generic dynamic simulator/analyzer for binary-cycle geothermal power plants for use on today's personal computers. The simulator/analyzer, as developed, can be used for (1) engineering analyses of static/dynamic performance and design trade-offs; (2) operator training and operating procedure evaluation; and (3) binary cycle technology demonstration. The simulator/analyzer consists of a set of ordinary non-linear differential equations that are programmed in a simulation language format and solved on an IBM-PC-AT. The equations are driven in an interactive mode by inputs from the PC keyboard and responses of plant temperatures, pressures, flows, etc., can be observed on a real-time color display that replicates a control room interface. Simulation predictions have been validated by comparisons with actual transient and steady state data taken from the Heber Binary Project, a 46.6 MWe binary-cycle demonstration power plant in operation in southern California. The simulation is accurate to within the uncertainty of the plant's process sensors. During this plant's later phases of construction, startup and operation, the simulator/analyzer is being used to: develop tuning constants for the Honeywell TDC-2000 control system, confirm failure/safety analyses study results, and support analyses of major operating events. It represents an adaptable tool for utilities and others involved in developing geothermal power generation facilities.

1509 Geothermal Engineering

32685 **(EPRI-AP—5153) Flash crystallization for the control of scaling in geothermal brine: Final report.** Brugman, J. (Holt (Ben) Co., Pasadena, CA (USA); Electric Power Research Inst., Palo Alto, CA (USA)). May 1987. 130p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920431.

One of the obstacles to the development of hydrothermal resources is the propensity of these fluids to deposit solid scale inside piping and equipment. In geothermal power plants, this scaling can be a major cause of plant outages, high operating costs, and reduced plant performance. In 1980, the Electric Power Research Institute initiated a program to investigate the feasibility of using crystallizer technology to minimize scaling by removing minerals from geothermal fluids at the separator. This report summarizes a number of engineering reports documenting various efforts in that program. It reviews the current theories of scale formation and presents a theoretical treatment of crystallization as applied to geothermal systems. The theoretical results are then applied to conventional commercial crystallization technology in order to create a design basis for a geothermal crystallizer. To better understand the capabilities, impacts, and requirements of adapting crystallizer technology to geothermal developments, a summary of chemical properties of typical geothermal resources is included and a conceptual design of a 50-MWe geothermal power plant using crystallizers for scale control is developed. To demonstrate the capability of crystallizer technology to control scale and to determine performance at a number of geothermal resources, a pilot-scale crystallizer test facility was designed and built. This report describes this portable facility and a sample test plan which will help develop the design parameters necessary for commercial-size installations.

1520 Geothermal Data And Theory

REFER ALSO TO CITATION(S) 32674

16 TIDAL AND WAVE POWER

1608 Wave Energy Converters

32686 **(ETSU-WU—1668-Pt.4) Long spine mooring. A report to the Wave Energy Steering Committee covering work supported by the United Kingdom Department of Energy.** (UKAEA Atomic Energy Research Establishment, Harwell. Energy Technology Div.; Edinburgh Univ. (UK)). 1986. 110p. British Library Document Supply Centre, Boston Spa, Wetherby, West Yorks LS23 7BQ.

Edinburgh University Wave Power Project.

A detailed analysis is presented of the static and dynamic characteristics of the mooring for the long spine model of 'ducks' for use in wave power. Experimental investigations on a 1 to 107.7 scale model in a wave tank are given. Conditions tested include freak wave experiments, South Uist wave climate and fatigue. Comparisons with theory were encouraging and pointed the way to design improvements which could reduce the loads on the mooring still further.

17 WIND ENERGY

1706 Wind Energy Engineering

REFER ALSO TO CITATION(S) 33348

32687 **(DOE/NASA—4105-3) Utility interconnection issues for wind power generation: Status report.** Herrera, J.I.; Lawler, J.S.; Reddoch, T.W.; Sullivan, R.L. (Electrotek Concepts, Inc., Knoxville, TN (USA); National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center). Jun 1986. Contract AI01-76ET20320. 43p. (NASA-CR—175056). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87005495.

This document organizes the total range of utility related issues, reviews wind turbine control and dynamic characteristics, identifies the interaction of wind turbines to electric utility systems, and identifies areas for future research. The material is organized at three levels: the wind turbine, its controls and characteristics; connection strategies as dispersed or WPSs; and the composite issue of planning and operating the electric power system with wind generated electricity.

32688 **(EPRI-AP—5044) Test and evaluation of a 500-kW vertical-axis wind turbine: Final report.** Wehrey, M.C.; Yinger, R.J.; Handschin, S.F. (Southern California Edison Co., Rosemead (USA); Electric Power Research Inst., Palo Alto, CA (USA)). Mar 1987. 116p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920350.

The objectives of this Electric Power Research Institute (EPRI) and Southern California Edison Company (SCE) project are to document and evaluate SCE's experiences while testing, operating and maintaining a vertical-axis wind turbine. The purpose of this effort was to develop an improved understanding of wind turbine technology and the future research requirements for advancing the state of the art. This test project was one of several EPRI projects having this purpose. A test plan was prepared containing a series of ten specific tasks to be performed over a two-year period beginning in January 1984. This final report covers the second year, ending December 31, 1985 and summarizes the main results of the first year of the project.

32689 **(EPRI-AP—5084) Status of commercial wind power: 1986 survey: Final report.** Steele, R.V.; McKellar, M.F. (Strategies Unlimited, Mountain View, CA (USA); Electric Power Research Inst., Palo Alto, CA (USA)). Mar 1987. 292p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920351.

The objectives of this project were: (1) to survey the status of commercial wind power stations; and (2) to gather data on wind turbine manufacturers and their products currently being offered for sale in the United States. This survey is the third sponsored by the Electric Power Research Institute. The data have been examined for trends relative to earlier surveys. The survey collected both technical and business-related information from 54 wind power station developers and 25 wind turbine manufacturers. The survey was performed by telephone and by questionnaires, and was supplemented by selected on-site interviews. Only those wind power stations were included that were already on-line by December 31, 1985. Only those wind turbine manufacturers were included that offered wind turbines for sale in the United States as of early 1986. This document includes descriptions of 122 wind power stations established by 54 developers. In terms of aggregate rating, over 98.3% of wind turbines are found in California. This concentration in California is the result of financial and institutional advantages currently found in that state. The 122 wind power stations profiled contain a total of 13,819 turbines installed with an aggregate rating of 1134 MW (manufacturer's nameplate rating). These turbines have been supplied by 32 different manufacturers - 16 located in the US and 16 located overseas. Through the end of 1985, 60.3% of the installed rating in US wind power stations had been supplied by manufacturers located in the US.

32690 **(FDO(B)—86-033) The FLEXHAT-project. The first phase.** (FDO Technische Adviseurs B.V., Amsterdam (Netherlands)). May 1986. 135p. (In Dutch). FDO Technische Advisieurs B.V., P.O. Box 379, 1000 AJ Amsterdam, Netherlands.

The FLEXHAT-project aims the transformation of the 25 m Horizontal Axis test Turbine (HAT) of ECN, Petten, Netherlands into an advanced turbine with a relative flexible 30 m rotor, passive and active blade adjustment and soft speed control. This turbine to be developed, the FLEXHAT will be a two-bladed test tubine. The commercial version will be the COMFLEX. The project is split-up into two phases. First phase is investigating wether all the intended system concepts are attainable indeed. During the second phase the rotor is to be designed and an idea of the total costs will be obtained. This report deals with the results of the first phase. A very soft speed control is possible by coupling the generator and the power grid via a DC-AC link (rectifier, choke and a line commutated converter). Fast eardynamic power and speed control occur by passive blade adjustment. The flexible blade tips bend backwards or into feathering position when wind load or speed exceed a certain limit (concerning speed: 60 rpm). For emergencies there is also an active blade adjustment. Hydraulic for the FLEXHAT and electric for the COMFLEX. The study proves that it is well possible to implement these design concepts into the HAT. The most favorable rotor diameter is 30 m, giving the turbine a capacity of 300 kW. A special safety system has been drawn-up for control and measurement during operation. Aerodynamic brakes are to be used. Rotor blades will be constructed from glass reinforced polyester. Three parts with different stiffness ensure good flexibility and aerodynamics. Preliminary designs are made for the blades and for adjusting systems for setting the blades into feathering position. Finally a survey is given of the modification necessary to realize the conversion of the present HAT into the FLEXHAT.

20 ELECTRIC POWER ENGINEERING

32691 (N—87-20055, pp vp) **Working group report on advanced high-voltage high-power and energy-storage space systems.** Cohen, H.A.; Cooke, D.L.; Evans, R.W.; Hastings, D.; Jongeward, G.; Laframboise, J.G.; Mahaffey, D.; Mcintyre, B.; Pfizer, K.A.; Purvis, C. Oct 1986. NTIS, PC A20/MF A01. (NASA-CR—180231; JPL-PUB—86-49; NAS—1.26:180231; CONF-8609284—).

From Workshop on space technology plasma issues in 2001; Pasadena, CA, USA (24 Sep 1986).

Space systems in the future will probably include high-voltage, high-power energy-storage and -production systems. Two such technologies are high-voltage ac and dc systems and high-power electrodynamic tethers. The working group identified several plasma interaction phenomena that will occur in the operation of these power systems. The working group felt that building an understanding of these critical interaction issues meant that several gaps in our knowledge had to be filled, and that certain aspects of dc power systems have become fairly well understood. Examples of these current collection are in quiescent plasmas and snap over effects. However, high-voltage dc and almost all ac phenomena are, at best, inadequately understood. In addition, there is major uncertainty in the knowledge of coupling between plasmas and large scale current flows in space plasmas. These gaps in the knowledge are addressed.

32692 (N—87-20055, pp vp) **Plasma issues associated with the use of electrodynamic tethers.** Hastings, D.E. Oct 1986. NTIS, PC A20/MF A01. (NASA-CR—180231; JPL-PUB—86-49; NAS—1.26:180231; CONF-8609284—).

From Workshop on space technology plasma issues in 2001; Pasadena, CA, USA (24 Sep 1986).

The use of an electrodynamic tether to generate power or thrust on the space station raises important plasma issues associted with the current flow. In addition to the issue of current closure through the space station, high power tethers (equal to or greater than tens of kilowatts) require the use of plasma contactors to enhance the current flow. They will generate large amounts of electrostatic turbulence in the vicinity of the space station. This is because the contactors work best when a large amount of current driven turbulence is excited. Current work is reviewed and future directions suggested.

2001 Power Plants And Power Generation

REFER ALSO TO CITATION(S) 33118

32693 **(EPRI-AP—5190) Gas turbine procurement and combined-cycle repowering: 1986 workshop: Final report.** Sanders, C.F. (Energy Systems Associates, Tustin, CA (USA); Electric Power Research Inst., Palo Alto, CA (USA)). May 1987. 337p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920429.

Two workshops related to gas turbine utilization in the electric utility industry were held in Pittsburgh, Pennsylvania, on September 23-26, 1986. A total of 83 persons participated in the workshops, with 26 electric utilities represented by 44 of the participants. The balance of the participants included gas turbine manufacturers, architectural/engineering firms, EPRI representatives, and professional staff of Energy Systems Associates, the contractor for organizing and operating the workshops. The first workshop, "Gas Turbine Procurement," included presentations on industrial gas turbines from four manufacturers, as well as presentations on specification, engineering, procurement, construction, instrumentation and control, and reliability, availability, and maintainability, as experienced by industry, engineering firms, and electric utilities. The second workshop, "Combined Cycle Repowering," included presentations of repowering engineering feasibility studies by four electric utilities of selected generating stations, including one nuclear station under construction. Separate abstracts were prepared for 10 papers in this workshop.

32694 **(EPRI-CS—5136) Acoustic boiler tube leak detection: Utility experience: Final report.** Anson, D.; Litt, R.D.; Shirley, F.W.; Stulen, F.B. (Battelle Columbus Div., OH (USA); Electric Power Research Inst., Palo Alto, CA (USA)). May 1987. 222p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920407.

This project report describes an evaluation of the use, effectiveness, and reliability of acoustic boiler leak detection systems in initial installations at US utilities. A total of five US utilities, representing eight boilers and 138 channels of leak detection equipment, are participating in this study. Acoustic boiler leak detection systems have been used in Europe for more than 10 years. The Central Electricity Generating Board of the UK participated in this study by providing their general experience and by specifically monitoring 12 boilers with 100 channels of leak detection equipment. Descriptions are provided of the three acoustic boiler leak detection systems commercially available in the US. The utility installations and initial experiences with the acoustic systems are described. Results of the study confirm that acoustic systems do detect leaks, often providing an early warning of small leaks not detectible by normal means. The early warning can occur several hours to several days before manual detection or excessive water make-up. This leak detection system can also identify which boiler section is affected (i.e., furnace, superheater, or economizer). The use of the early warning information varied with plant operating requirements. Many times the boilers were shut down promptly to minimize secondary damage to adjacent tubes. Several incidents of progressive leak development show that the boiler can be planned to coincide with low load/demand and a convenient maintenance schedule. If a unit is kept on stream until make-up water rates become excessive, because of very high load demand, this benefit is lost; similarly, where leaks develop very rapidly or in cases of sudden rupture, there is no opportunity for maintenance planning. 34 figs., 15 tabs.

32695 **Parallel, staged opening switch power conditioning techniques for flux compression generator applications.** Reinovsky, R.E.; Levi, P.S.; Bueck, J.C.; Goforth, J.H. (Air Force Weapons Lab., Kirtland AFB, NM 87117-6008). pp 204-207 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—).

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

Pulse power systems which are capable of delivering several megajoules of electrical energy to experimental loads in a fraction of a microsecond are currently of interest in the scientific community for driving a variety of plasma and particle beam loads. Practical considerations of cost and complexity frequently demand that system designers make use of primary power sources that are both compact and economical. Such compact power sources as flux compression generators and large relatively low voltage capacitor banks represent economical ways to make multi-megajoule level energies readily available.

32696 **Photonic diagnostics and pulsed power research.** Chang, J.; Allen, G.; Filter, W.F.; Lockwood, G.J.; Neyer, B.T. (Diagnostics Div., 1234, Sandia National Labs., P.O. Box 5800, Albuquerque, NM 87185). pp 1-4 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—).

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

Photonic methods offer a powerful approach to pulsed power diagnostics. The use of photon analog signals rather than the conventional electrical analog signals to make pulsed power measurements is a fundamental change that promises to revolutionize pulsed power research. This new approach uses inherently broadband optical components and a picosecond streak camera to perform high speed measurements. The authors have developed sensors that use photonics principles to monitor voltages and currents, methods of using optical fibers to transmit the photon analog signals, and a High Speed Multi-Channel Data Recorder to economically record them. This system not only offers economy, compactness, high bandwidth, and EMI resistance, but it also accesses high field regions previously impossible to reach with metallic electrical monitors. The photonic system will greatly reduce the complexity of pulsed power diagnostics.

2002 Environmental Control Technology

REFER ALSO TO CITATION(S) 32466, 32619, 33741, 33758, 33760

32697 **(DOE/BP/23638—1) Determination of fishery losses in the Flathead System resulting from the construction of Hungry Horse Dam: Final completion report, 1986.** Zubik, R.J.; Fraley, J. (Montana Dept. of Fish, Wildlife and Parks, Kalispell (USA)). Apr 1987. Contract AI79-85BP23638. 57p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87009925.

This study is part of the Northwest Power Planning Council's residential fish and wildlife plan, which is responsible for mitigating damages to fish and wildlife resources caused by hydroelectric development in the Columbia River basin. The major goal of this study was to provide estimates of fishery losses to the Flathead system as a result of the completion of Hungry Horse Dam and to propose mitigation alternatives for enhancing the fishery. Construction of Hungry Horse Dam had the greatest adverse impacts on cutthroat and full trout from Flathead Lake and mitigative measures should be taken to offset these losses, if biologically and economically feasible. Also, other losses to fish and wildlife have been documented in the Flathead basin due to hydroelectric facilities and their operation. Some of these research projects will not be completed until 1989, when mitigation will be recommended using a basin-wide approach. Since HHR is at the headwaters of the Columbia system, mitigative measures may also affect downstream projects. Therefore, we presented an array of possible mitigation alternatives for consideration by decision-makers, with suggestions on the ones we feel are the most cost effective. Possible mitigation measures are included.

32698 **(DOE/EIS—0125-Vol.1) Intertie development and use: Volume 1: Draft environmental impact statement.** (USDOE Bonneville Power Administration, Portland, OR). Oct 1986. 323p. NTIS, PC A14/MF A01; 1; GPO Dep. File Number DE87010349.

It is proposed to increase the capacity of the Pacific Northwest-Pacific Southwest Intertie, and to develop a Long Term Intertie Access Policy (Intertie Access Policy or IAP) for the BPA-owned parts of the Intertie. Intertie capacity, presently 5200-megawatts (MW), is being increased to 6300 MW (DC Terminal Expansion) and may be increased further (third AC/California-Oregon Transmission Project) to ~7900 MW. Access for regional and extraregional entities to BPA's portions of the Intertie is governed now by the Near Term Intertie Access Policy. Intertie access could be regulated by returning to a first-come, first-served approach or by a combination of different ways to allocate capacity for transfers of nonfirm power; ways to provide assured access to the Intertie for long-term firm power sales; ways to consider appropriate access for power from new resources; ways to permit or restrict access for hydroelectric resources which may adversely affect BPA's efforts to protect fish and wildlife; and ways to consider allocation of Intertie access for entities outside the Pacific Northwest (PNW) region. Capacity increases would create small increases in air pollution from coal generation in the PNW, and larger decreases from reduced gas and oil generation elsewhere. Forced dam spill would be reduced, with mixed effects on fish. Nonfirm allocation options would affect PNW secondary revenue distribution. The option granting BPA first access would slightly decrease PNW air pollution and slightly increase air pollution in California. It would also reduce some fish stock survival rates. Long-term firm contracts would allow some new resource construction to be deferred in both the PNW and California. New resource access conditions would affect the amount of new resource construction in the PNW.

32699 **(DOE/EIS—0125-Vol.2) Intertie development and use: Volume 2, Proposed long term intertie access policy: Draft environmental impact statement.** (USDOE Bonneville Power Administration, Portland, OR). Oct 1986. 20p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010350.

It is proposed to increase the capacity of the Pacific Northwest-Pacific Southwest Intertie and to develop a Long Term Intertie Access Policy (Intertie Access Policy or IAP) for the BPA-owned parts of the Intertie. Intertie capacity, presently 5200-megawatts (MW), is being increased to 6300 MW (DC Terminal Expansion) and may be increased further (Third AC/California-Oregon Transmission Project) to ~7900 MW. Access for regional and extraregional entities to BPA's portions of the Intertie is governed now by the Near Term Intertie Access Policy. Intertie access could be regulated by returning to a first-come, first-served approach or by a combination of different ways to allocate capacity for transfers of nonfirm power; ways to provide assured access to the Intertie for long-term firm power sales; ways to consider appropriate access for power from new resources; ways to permit or restrict access for hydroelectric resources which may adversely affect BPA's efforts to protect fish and wildlife; and ways to consider allocation of Intertie access for entities outside the Pacific Northwest (PNW) region. Capacity increases would create small increases in air pollution from coal generation in the PNW, and larger decreases from reduced gas and oil generation elsewhere. Forced dam spill would be reduced, with mixed effects on fish. Nonfirm allocation options would affect PNW secondary revenue distribution. The option granting BPA first access would slightly decrease PNW air pollution and slightly increase air pollution in California. It would also reduce some fish stock survival rates. Long-term firm contracts would allow some new resource construction to be deferred in both the PNW and California. New resource access conditions would affect the amount of new resource construction in the PNW.

32700 **(DOE/ET/13543—2291) Background data on utility sector fossil fuel-fired facilities: Final report.** (Engineering-Science, Inc., Atlanta, GA (USA)). Mar 1987. Contract AC21-79ET13543. 242p. NTIS, PC A11/MF A01; 1; GPO Dep. File Number DE87001089.

An analysis is provided of the range of potential impacts on utility and industrial fossil fuel-fired facilities and specific emerging technologies resulting from the implementation of regulations under the Resource Conservation and Recovery Act of 1976 (RCRA). The impact analysis includes the estimation of the costs associated with the implementation of RCRA for non-hazardous and hazardous material disposal in the utility industry. The study also includes an assessment of other Federal environmental regulations as they pertain to RCRA and fossil fuel-fired facilities.

32701 **(DOE/ET/13543—2316-Vol.1) Impacts of proposed RCRA regulations and other related federal environmental regulations on Fossil Fuel-Fired Facilities: Final report, Volume 1.** (Engineering-Science, Inc., Atlanta, GA (USA)). Mar 1987. Contract AC21-79ET13543. 353p. NTIS, PC A16/MF A01; 1; GPO Dep. File Number DE87001090.

In order to fulfill its responsibilities, DOE contracted with Engineering-Science to perform a multi-phase engineering and economics study to evaluate the impact of the proposed RCRA regulations and other related federal environmental regulations on coal-fired utilities. This Interim Phase I report presents the findings of the impacts of proposed RCRA and related federal regulations on the utility sector fossil fuel-fired facilities. Subsequent phases involve parallel engineering studies on the industrial sector as well as economic evaluations. The framework of this study was based on the development and analysis (engineering and economic) of four regulatory scenarios for the disposal of fly ash, bottom ash and FGD sludge from the utility industry.

32702 **(DOE/FE—0085) Comprehensive report to congress Clean Coal Technology Program: LIMB demonstration project extension.** (USDOE Assistant Secretary for Fossil Energy, Washington, DC). Apr 1987. 55p. NTIS, PC A04/MF A01; GPO Dep. File Number DE87009793.

In response to the resulting Program Opportunity Notice (PON), fifty-one proposals were received in April 1986. After evaluation, nine projects, representing seven different technologies, were selected in July 1986 for funding under the Clean Coal Technology (CCT) Program. One of the nine projects selected was the Babcock and Wilcox proposal to extend an EPA funded demonstration of the Limestone Injection Multistage Burner (LIMB) proces using three additional coals and four additional sorbents. This project also includes a demonstration of the Coolside process, in which sorbent and water are injected downstream of the boiler. The LIMB process claims to achieve a 50 to 60% SO/sub x/ reduction by injecting dry sorbent into the boiler at a point above the burners. The sorbent then travels through the boiler and is removed along with fly ash in the existing particulate removal equipment, either an electrostatic precipitator (ESP) or a baghouse. In the Coolside process, dry sorbent is injected into the flue gas after the boiler and before the ESP. The gas is also humidified in this process, to enhance both ESP performance and SO/sub x/ absorption. Also, a chemical additive will be dissolved in the humidification water to further improve SO/sub x/ absorption. Because of these benefits, it is expected that humidification equipment will be part of most, if not all, commercial Coolside applications. The spent sorbent is also collected with the fly ash as in the LIMB Process. Reduction of SO/sub x/ in the 50 to 80% range is expected. Both demonstrations will utilize the same low NO/sub x/ (nitrogen oxide) burners for control of NO/sub x/. The LIMB and Coolside processes both provide an alternative to conventional wet Flue Gas Desulfurization (FGD) processes. Both are expected to be substantially less expensive than wet FGD, and their space requirements are also substantially less. These factors are very important in retrofit applications.

32703 **(EPRI-CS—5180) Commercial assessment of condenser-targeted chlorination: Final report.** Mussalli, Y.G.; Pfischner, F.L. Jr.; Horst, T.J. (Stone and Webster Engineering Corp., Boston, MA (USA); Electric Power Research Inst., Palo Alto, CA (USA)). May 1987. 62p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920439.

Condenser biofouling is a major source of problems causing poor power plant availability and efficiency. Targeted chlorination is a new concept in condenser chlorination that has the potential to improve performance, reduce chlorine requirements, and enable utilities to meet increasingly stringent effluent limitations. The results of this commercialization study indicate that as many as 1000 generating plants could beneficially apply targeted chlorination. This report contains the results of a commercial application survey of chlorination methods, a summary of regulations related to chlorine in plant effluents, and a commercialization strategy to transfer this technology and to support widespread application by utilities.

32704 **(EPRI-EA—5200-Vol.2) Compensatory mechanisms in fish populations: Literature reviews: Volume 2, Compensation in fish populations subject to catastrophic impact: Final report.** Jude, D.J.; Mansfield, P.J.; Schneeberger, P.J.; Wojcik, J.A. (Michigan Univ., Ann Arbor (USA). Great Lakes Research Div.; Electric Power Research Inst., Palo Alto, CA (USA)). May 1987. 194p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920444.

This study comprises an extensive literature review, critical evaluations of case histories, and considered recommendations for future research on the mechanisms and extent of compensation by various fish species subject to catastrophic impacts. "Catastrophic impact" was defined as an event which removes some limitation (such as food or space) on a fish population. Those events studied included new species introduction, toxic spills, exploitation of specific fish populations, and drawdown. The fish studied each had more than one compensatory mechanism available, and thus were able to respond to a catastrophic event even if an option was removed. Predation, overfishing, competition, disease, and parasitism are all potential catastrophies, but were found not to cause a catastrophic impact (except in special cases). In general, compensatory responses were determined to vary widely, even for species which perform fairly similar functions in an ecosystem. The extensive nature of this study, however, pointed up the many data gaps in the existing literature; recommendations are therefore made for follow-

up research and expansion of ongoing monitoring programs, based on an evaluation of their relative importance.

2003 Power Transmission And Distribution

32705 **Implementation of real-time regulator and capacitor control on the Athens Utilities Board.** Rizy, D.T. (Energy Div., Oak Ridge National Lab., Oak Ridge, TN). pp 79-87 of Proceedings of the IEEE Southeastcon 86 conference. Piscataway, NJ; IEEE Service Center (1986). (CONF-8603139—). Contract AC05-84OR21400.

From Southeastcon '86: IEEE region 3 conference and exhibit; Richmond, VA, USA (23 Mar 1986).

As part of the Athens Automation and Control Experiment (AACE), Oak Ridge National Laboratory (ORNL) is testing real-time regulator and capacitor control on three substations and twelve distribution feeders of the Athens Utilities Board (AUB) in Athens, Tennessee. The objective is to test the effectiveness of computer-automated capacitor and regulator control in reducing line losses, leveling and/or raising feeder voltage profiles, and reducing energy use. Real and reactive power flows and bus voltage data collected at the substation and on the feeders are being used to initiate and evaluate the real-time control. Results of capacitor control experiments conducted in January 1986 are presented. The experiments confirm the controllability of capacitors and the expected impact of capacitors on reactive power and voltages. Load fluctuations and noise in some of the data taken to date make it difficult to quantify the effect of capacitor switching on real power.

32706 **Power flow evaluations for HERMES III.** Smith, D.L.; Ramirez, J.J.; Corley, J.P.; Hasti, D.E. (Sandia National Labs., Albuquerque, NM 87185). pp 760-763 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—). Contract AC04-76DP00789.

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

A study has been conducted to evaluate the transfer of electromagnetic pulses from water dielectric strip transmission lines into a diode insulator stack. The HERMES III Scale Model Experiments (HERMEX) included single-stage diodes as well as multistage models in which a variety of parallel/series combinations of strip transmission lines (strip lines) were used to evaluate the voltage adding efficiency at the diode. A technique has been established to estimate an equivalent shunt impedance across the diode due to the nearby uncharged water volume.

21 NUCLEAR POWER PLANTS

32707 (CONF-870406—, pp II.2.1-II.2.11) **Training-related NUMARC activities.** Holyoak, R.H. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

NUMARC, Nuclear Utilities Management and Resources Committee, was formed in March of 1984 and is a confederation of 55 utilities that function day to day in the nuclear area. It's genesis was the initiative by the Nuclear Regulatory Commission staff in the proposed SECY-84-76A regulations which the NRC Commissioners were considering. SECY-84-76A covered regulations in management and people related areas, rules on training, degrees for shift supervisors, rules in maintenance activities, senior management on shift and fitness for duty. The executives of the nuclear industry did not believe that the proposed regulations were in the best interest of nuclear safety and reliability, and would have a negative impact on industry self-improvement initiatives that were underway and actually could have a negative impact on nuclear power plant operation. Enactment of SECY-84-76A would have had the effect of freezing the current INPO accreditation program, destroying the dynamics of this growing INPO program. Implementing SECY-84-76A would have caused a prudent utility industry to wait and see what the NRC would mandate instead of continuing activities to enhance programs and strive for excellence, and end up meeting only minimum standards as specified by law.

32708 (CONF-870406—, pp III.A.1.1-III.A.1.9) **Personnel selection and emotional stability certification: establishing a false negative error rate when clinical interviews.** Berghausen, P.E. Jr. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

The security plans of nuclear plants generally require that all personnel who are to have unescorted access to protected areas or vital islands be screened for emotional instability. Screening typically consists of first administering the MMPI and then conducting a clinical interview. Interviews-by-exception protocols provide for only those employees to be interviewed who have some indications of psychopathology in their MMPI results. A problem arises when the indications are not readily apparent: False negatives are likely to occur, resulting in employees being erroneously granted unescorted access. The present paper describes the development of a predictive equation which permits accurate identification, via analysis of MMPI results, of those employees who are most in need of being interviewed. The predictive equation also permits knowing probably maximum false negative error rates when a given percentage of employees is interviewed.

32709 (CONF-870406—, pp III.A.2.1-III.A.2.9) **Application of human factors design review principles and data to training.** Duquette, D.R.; Gaddy, C.D.; Martin, T. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

Detailed control room design reviews have been conducted at nuclear power plants to evaluate human factors considerations in the control room. Human factors is a discipline dedicated to improving system design from the operations perspective. The human factors principles considered during the design reviews are also applicable to training. In addition, much of the data generated during the design reviews can be used by training personnel in the development of lesson plans and in classroom or simulator presentations.

32710 (CONF-870406—, pp III.A.3.1-III.A.3.24) **Expanding role of operations training.** Bernardi, M.S. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

The number of licensed nuclear power plants producing commercial electricity is climbing. Attitudes and skills successfully applied to developing the industry are less successfully applied to managing plants in a steady-state mode of operations. Fine-tuning the complex relationships between people and technology is a challenge that requires a fresh perspective. An increasing number of industry guidelines indicate that effective teamwork, communication, leadership, and diagnostic skills are aspects of human performance requiring attention. A total system view is suggested as a framework to integrate these training needs with the existing base of technical instruction. The total system perspective balances the needs of people and the needs of the physical plant against the unifying favors a leadership role for the training function.

32711 (CONF-870406—, pp III.A.4.1-III.A.4.11) **Improved human performance through appropriate work scheduling.** Morisseau, D.S.; Lewis, P.M.; Persensky, J.J. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

The Nuclear Regulatory Commission (NRC) has had a policy, Generic Letter 82-12, on hours of work since 1982. The policy states that licensees should establish controls to prevent situations where fatigue could reduce the ability of operating personnel to perform their duties safely (USNRC 1982). While that policy does give guidance on hours of work and overtime, it does not address periods of longer than 7 days or work schedules other than the routine 8-hour day, 40-hour week. Recognizing that NRC policy could provide broader guidance for shift schedules and hours of overtime work, the Division of Human Factors Safety conducted a project with Pacific Northwest Laboratories (PNL) to help the NRC better understand the human factors principles and issues concerning hours of work so that the NRC could consider

updating their policy as necessary. The results of this project are recommendations for guidelines and limits for periods of 14 days, 28 days, and 1 year to take into account the cumulative effects of fatigue. In addition, routine 12-hour shifts are addressed. This latter type of shift schedule has been widely adopted in the petroleum and chemical industries and several utilities operating nuclear power plants have adopted it as well. Since this is the case, it is important to consider including guidelines for implementing this type of schedule. This paper discusses the bases for the PNL recommendations which are currently being studied by the NRC.

32712 (CONF-870406—, pp III.A.6.1-III.A.6.9) **Human factors & training the partnership agreement.** Macris, A.C.; Fleming, S.T. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

Four fundamental activities directly affect human performance in operating nuclear power plants: Control Room Design Reviews (CRDR's); Operating Procedures; Training Curriculum Materials; Simulator Training. Typically it was believed that multi-disciplined core teams, for each activity, provided an integration of all activities. Representatives of each discipline (CRDR, Engineering, Training, Simulator Project) provided real time inputs during team deliberations. While these inputs affected team decisions, there were no assurances that any functional follow-up would result. Furthermore, no mechanism existed for systematic integration between activities. Now, with a majority of the Control Room Design Reviews complete, plant specific simulators becoming a reality, and the incorporation of Safety Parameter Display System (SPDS) and Symptom Based EOP's; the reality is that these activities require more systematic integration than was previously recognized. This paper presents an innovative approach for integrating the above four activities using Computer Aided Drafting (CAD) and computerized Data Base Management (DBM) to synergistically optimize human performance.

32713 (CONF-870406—, pp III.B.1.1-III.B.1.9) **Developing the desire for change.** Gooch, B.G. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

This article leads the reader through the process of developing human potential by examining the assumption that development and change are synonymous concepts, and that many basic assumptions held regarding human reaction to change are false. If trainees proceed down the path filled with false premises, their task of improving performance is made more difficult. After resolution of basic truths concerning the nature of change, the article examines the process of creating a desire within individuals that will lead beyond motivation to activation. The article attempts to identify and discuss factors that are important to creating within individuals the desire to improve their performance.

32714 (CONF-870406—, pp III.B.2.1-III.B.2.10) **Non-training related causes of personnel performance problems: the role of organizational value systems.** Zaret, R. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

Training is frequently viewed as a panacea for all personnel related problems. Whenever an inexplicable incident occurs, training is verbalized by many as the solution, or worse, as the cause of the incident. All to frequently, training organizations are needlessly commissioned to develop some elaborate course, only to discover that the training is irrelevant to the problem. While training as a solution to an incident is socially acceptable, its' use clouds the real issue. The purpose of this paper is to emphasize that there are many reasons people do not perform, many of which are related to organizational culture or values. Values directly influence all activities which the authors are involved in, even to the extent of how they perceive their environment. They exert a strong, pervasive influence on what and how they perform.

32715 (CONF-870406—, pp III.B.4.1-III.B.4.11) **Why training doesn't take.** Hyldahl, T.R. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

For some reason, in spite of effective program design and development and excellent instruction, trainees don't perform as expected when they get back to the job. The industry's initial response to this lack of performance is to assume that something is wrong with the training. The authors strategy has usually been to attempt to change the program or the means of instruction. What they fail to realize is that trainees, for some reason, choose not to learn or to forget what was learned. This presentation will deal with a number of other factors that would account for trainee inability to assimilate or retain information. It will also include the strategies for determining what these factors are. The factors that will be dealt with will include: 1. Lack of attention. 2. Insufficient trainee knowledge (ineffective processing of new data). 3. Emotional blocking of reception or memory. 4. No immediate application of learning. 5. Poor motivation for learning or remembering. 6. Lack of response to trainee needs, concerns, or questions.

32716 (CONF-870406—, pp III.B.5.1) **Situations that can help you fail the NRC examination.** McMillen, J.I. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

Conditions which can lead to failure of the NRC examination of persons who have shown great promise during the training program are explored. Several of these conditions are cited through the personal experiences of the author over the many years of administration of examinations. Although these things do not happen very often, it is concluded that training personnel should be aware of what might happen and build on their relationship with the trainees so that they can counsel them on the possible alternatives that they have in the face of unusual circumstances.

32717 (CONF-870406—, pp IV.A.2.1-IV.A.2.14) **Using a micro computer based test bank.** Hamel, R.T. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

Utilizing a micro computer based test bank offers a training department many advantages and can have a positive impact upon training procedures and examination standards. Prior to data entry, Training Department management must pre-review the examination questions and answers to ensure compliance with examination standards and to verify the validity of all questions. Management must adhere to the TSD format since all questions require an enabling objective numbering scheme. Each question is entered under the enabling objective upon which it is based. Then the question is selected via the enabling objective. This eliminates any instructor bias because a random number generator chooses the test question. However, the instructor may load specific questions to create an emphasis theme for any test. The examination, answer and cover sheets are produced and printed within minutes. The test bank eliminates the large amount of time that is normally required for an instructor to formulate an examination. The need for clerical support is reduced by the elimination of typing examinations and also by the software's ability to maintain and generate student/course lists, attendance sheets, and grades. Software security measures limit access to the test bank, and the impromptu method used to generate and print an examination enhance its security.

32718 (CONF-870406—, pp IV.A.3.1-IV.A.3.8) **Role of simulator training in developing teamwork and diagnostic skills.** Grimme, W.E. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

A review of the evolution of the control room team is necessary to understand team training needs. As control room responsibilities have increased and members have been added to the operating crews, teamwork and strong leadership has become crucial to the efficiency of these operating crews. In order to conduct effective team training in a simulated control room, it is essential that the fundamental principles of role definition and common team values are fully developed. The diagnostics model used to develop problem-solving skills must be adaptable to the dynamic environ-

ment of the control room. Once the fundamental principles of team building and a good diagnostics model are mastered, many training techniques using a simulator are available to perfect the development of team building and diagnostic skills.

32719 (CONF-870406—, pp IV.A.4.1-IV.A.4.6) **Use of video taping during simulator training.** Helton, M.; Young, P. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

The use of a video camera for training is not a new idea and is used throughout the country for training in such areas as computers, car repair, music and even in such non-technical areas as fishing. Reviewing a taped simulator training session will aid the student in his job performance regardless of the position he holds in his organization. If the student is to be examined on simulator performance, video will aid in this training in many different ways.

32720 (CONF-870406—, pp IV.A.5.1-IV.A.5.6) **I & C maintenance training simulators meeting the goals of nuclear plant training.** Shilmover, S. Jr. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

An instructor's overall goal in I & C training is to impart as much skill and knowledge as possible about the operation, tune up and troubleshooting of a piece of equipment. Through the use of a training simulator, the instructor has the actual equipment to demonstrate the principles he is trying to make. A student's goal in training is to improve his skills by learning as much as possible about the equipment he will be responsible for. When a simulator is used, a student gets hands-on time with the equipment where normal and abnormal conditions can be demonstrated. The students may be asked to perform job-related tasks and be evaluated on their performance. An employer's goal is to get personnel who can quickly fit into their work force. When training is performed using simulators, the employee receives the knowledge and hands-on skills necessary to quickly fit into the work force. The employee also gains confidence in working with the equipment. Another advantage for the employer is that training can be performed without shutting down the plant equipment. The employer thus can use the trained employees sooner and mainstream them into the work force.

32721 (CONF-870406—, pp IV.A.6.1-IV.A.6.5) **Incidental instructor training-Duke Power's answer to prepare the occasional classroom instructor or visiting vendor.** Salas, J.R. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

To ensure occasional instructors deliver instruction that is systematically organized Duke Power's Production Training Services has developed an Incidental Instructor Training Package in self-study and group workshop formats. This paper describes the training package, its implementation and results.

32722 (CONF-870406—, pp IV.B.1.1-IV.B.1.8) **Proposed combination of training and education to meet the bachelor of science requirements.** Wilson, A.E. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

The basic similarities and differences of the education and training which, in the author's opinion, are actually needed by reactor operators are outlined and compared with the NRC requirements. Examples of engineering degree programs are presented to demonstrate that they are NOT the appropriate educational goal for a senior reactor operator. A possible program of study which could be implemented jointly by a utility and a nearby college or university is presented. The program combines both education and training to complete the requirements for a bachelors degree. Those student-operators entering the program should be able to work as auxiliary operators while pursuing the degree part time and qualify for the NRC Reactor Operator exam in five years. Then, while working as RO's, they should complete the degree requirements in another year. After an additional year of RO experience, they should meet the NRC requirements for Senior Operator. Finally, some of the possible pitfalls of such a program are discussed. These include such things as drop-outs, union agreements, inflexibility of educational institutions and, of course, cost.

32723 (CONF-870406—, pp IV.B.2.1-IV.B.2.9) **University-industry consortium: maximizing the use of limited resources for instructor training.** Norton, R.E.; Williams, T.M. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

This proposed development effort would accomplish three major objectives, as follows: 1. To identify and verify, through job analysis, the critical professional tasks that must be performed by electric utility instructors. 2. To adapt and revise existing instructor training modules to make them self-contained and highly specific to the professional knowledge and skills needed by electric utility instructors. 3. To develop new instructor training modules, if needed, to meet utility instructor training needs that are not addressed by any existing materials. It is anticipated that approximately twenty (20) modules will be needed to address all of the critical instructor tasks identified during the job analysis phase. The National Center for Research in Vocational Education proposes that it would be very cost-effective and time-efficient to cooperatively undertake the development of the needed instructor training modules with a consortium of about to ten interested electric utility companies.

32724 (CONF-870406—, pp IV.B.3.1-IV.B.3.11) **Job relevance of engineering and specialized educational programs for licensed reactor operators.** Melber, B.D.; Saari, L.M. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

This study investigates the extent to which traditional baccalaureate engineering degree programs and specialized educational programs for reactor operators cover academic knowledge needed for licensed operator job functions. Academic knowledge items identified by a job analysis were systematically compared to the curricula of a sample of the educational programs. Approximately 65% of the academic knowledge identified as necessary for the positions of RO and SRO is taught in college level engineering courses. College engineering curriculum provides considerable material beyond that identified as necessary for licensed operators. There is a great deal of variation among specialized programs for reactor operators, ranging from coverage of 15% to 65% of job-related academic knowledge. Half of the schools cover at least 50%, and half cover less than 30% of this knowledge content.

32725 (CONF-870406—, pp IV.B.4.1-IV.B.4.6) **Experiences in solving the challenges of on-site degree programs.** Christenson, J.M.; Eckart, L.E. (Univ. of Cincinnati, OH). Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

The University of Cincinnati (UC) Nuclear Engineering Program Faculty has now had six years of experience in delivering on-site educational programs to nuclear power plant technical personnel. Programs of this type present a variety of challenges to the faculty, the management of the client utility and to the students who become involved in a particular program. This paper describes how each of these groups can identify and successfully solve these challenges. The solutions the authors describe are drawn from their own experiences which have been described in some detail elsewhere. Other solutions to those challenges are certainly possible. They make no claim for the particular ones they offer, beyond the fact that they have worked over a sustained period of time and that results they have produced have left all three parties mutually satisfied.

32726 (CONF-870406—, pp IV.B.5.1-IV.B.5.5) **Getting the most out of training and education through personal awareness.** Carroll, J.E. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

Team training has proven very successful in reducing, accidents in the aviation industry. Application of team training principals to the nuclear industry should significantly reduce the likelihood and impact of operator error.

32727 (CONF-870406—, pp V.A.1.1-V.A.1.19) **Team training process for nuclear plant technicians.** Macris, A.C. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

The purpose of team training is the cooperative and coordinated actions of individual to attain a common goal. Such training requires the development of more sophisticated educational techniques than those previously established for training individuals alone. Extensive research has been conducted to devise methods and techniques to bring about effective team training. This paper discusses current team training methods and present an instructional strategy for the application of effective team training techniques.

32728 (CONF-870406—, pp V.A.2.1-V.A.2.12) **Evaluation of team skills for control room crews.** Gaddy, C.D.; Koontz, J.L. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

Although team training has received considerable attention throughout industry, a systematic approach to team skills training has only recently been proposed for control room crews. One important step of the approach to team skills training is evaluation of team skills. This paper describes methods and resources, and program considerations in team skills evaluation. The three areas pertaining to methods and resources are: development of evaluation criteria, preparation of event scenarios, and instructor training and additional resources. The program considerations include sequencing and coordination of team skills evaluation in the context of an overall operator training program.

32729 (CONF-870406—, pp V.A.6.1-V.A.6.15) **Effective training for the nuclear field using computers.** Forrer, S.E.; Dickelman, G.J. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

Since the introduction of microcomputers there have been training applications in many disciplines; the nuclear field is no exception. Because of the use of computers in training, a variety of development tools known as authoring systems have emerged for creating instruction. There is clearly a connection between the capabilities of the authoring systems and the effectiveness of the training they produce. Unfortunately, it is too often the case that the limitations of the authoring systems drive the instructional design of the programs they produce. The result is very poor of limited instruction. This paper deals with the instructional design of good nuclear training material and its implications for features that must exist in an authoring system. The paper looks at four categories: visual displays, sound, interaction, and realism. Each category is examined from the standpoint of training program content and instructional design, then the authoring system features that are required to support each category are determined. Consideration is given not only to the list of features, but also to their integration, ease of use, and flexibility.

32730 (CONF-870406—, pp V.A.7.1-V.A.7.14) **Computer based training for NPP personnel (interactive communication systems and functional trainers).** Martin, H.D. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

KWU as a manufacturer of thermal and nuclear power plants has extensive customer training obligations within its power plant contracts. In this respect KWU has gained large experience in training of personnel, in the production of training material including video tapes an in the design of simulators. KWU developed interactive communication systems (ICS) for training and retraining purposes with a personal computer operating a video disc player on which video instruction is stored. The training program is edited with the help of a self developed editing system which enables the author to easily enter his instructions into the computer. ICS enables the plant management to better monitor the performance of its personnel through computerized training results and helps to save training manpower. German NPPs differ very much from other designs with respect to a more complex and integrated reactor control system and an additional reactor limitation system. Simulators for such plants therefore have also to simulate these systems. KWU developed a Functional Trainer (FT) which is a replica of the primary system, the auxiliary systems linked to it and the associated control, limitation and protection systems including the influences of the turbine operation and control.

32731 (CONF-870406—, pp V.A.8.1-V.A.8.7) **Comparing interactive videodisc training effectiveness to traditional training methods.** Kenworthy, N.W. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

Videodisc skills training programs developed by Industrial Training Corporation are being used and evaluated by major industrial facilities. In one such study, interactive videodisc training programs were compared to videotape and instructor-based training to determine the effectiveness of videodisc in terms of performance, training time and trainee attitudes. Results showed that when initial training was done using the interactive videodisc system, trainee performance was superior to the performance of trainees using videotape, and approximately equal to the performance of those trained by an instructor. When each method was used in follow-up training, interactive videodisc was definitely the most effective. Results also indicate that training time can be reduced using interactive videodisc. Attitudes of both trainees and instructors toward the interactive videodisc training were positive.

32732 (CONF-870406—, pp V.B.1.1-V.B.1.8) **Methods for evaluation of industry training programs.** Morisseau, D.S.; Roe, M.L.; Persensky, J.J. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

The NRC Policy Statement on Training and Qualification endorses the INPO-managed Training Accreditation Program in that it encompasses the elements of effective performance-based training. Those elements are: analysis of the job, performance-based learning objectives, training design and implementation, trainee evaluation, and program evaluation. As part of the NRC independent evaluation of utilities implementation of training improvement programs, the staff developed training review criteria and procedures that address all five elements of effective performance-based training. The staff uses these criteria to perform reviews of utility training programs that have already received accreditation. Although no performance-based training program can be said to be complete unless all five elements are in place, the last two, trainee and program evaluation, are perhaps the most important because they determine how well the first three elements have been implemented and ensure the dynamic nature of training. This paper discusses the evaluation elements of the NRC training review criteria. The discussion will detail the elements of evaluation methods and techniques that the staff expects to find as integral parts of performance-based training programs at accredited utilities. Further, the review of the effectiveness of implementation of the evaluation methods is discussed. The paper also addresses some of the qualitative differences between what is minimally acceptable and what is most desirable with respect to trainee and program evaluation mechanisms and their implementation.

32733 (CONF-870406—, pp V.B.2.1-V.B.2.6) **Accreditation self-evaluation: an effective program evaluation tool.** Fritchley, R.L. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

The Institute of Nuclear Power Operation's (INPO) Accreditation Program includes a systematic evaluation that subsequently

improves nuclear utility training programs. The process begins with a utility-conducted self-evaluation that measures its training programs against the accreditation criteria and objectives. When properly conducted, the self-evaluation results should identify weaknesses within each program as well as program strengths. Utilities are then expected to take the necessary actions to correct the weaknesses that have been found. Experience with the process has shown that a properly conducted self-evaluation can also be an effective program evaluation. In addition, much of the data and information that are collected and used during the self-evaluation process are also used in conducting other evaluations of the training organization and programs. This paper will discuss using the self-evaluation process as a tool for conducting program evaluations.

32734 (CONF-870406—, pp V.B.3.1-V.B.3.10) **Training effectiveness feedback.** Wiggin, N.A. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

A formal method of getting feedback about the job performance of employees is a necessary part of all the authors training programs. The formal process may prove to be inadequate if it is the only process in use. There are many ways and many opportunities to get good feedback about employee performance. It is important to document these methods and specific instances to supplement the more formalized process. The key is to identify them, encourage them, use them, and document the training actions that result from them. This paper describes one plant's method of getting feedback about performance of technicians in the field.

32735 (CONF-870406—, pp V.B.4.1-V.B.4.22) **Training evaluation as an integral component of training for performance.** Lapp, H.J. Jr. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

A training evaluation system should address four major areas: reaction, learning, behavior, and results. The training evaluation system at GPU Nuclear Corporation addresses each of these through practical approaches such as course and program evaluation. The major aspects of each practical component of this system are described along with an organizational structure to implement. A training evaluation system is an important tool of improving plant performance by assessing trainee performance both in training and in the plant.

32736 (CONF-870406—, pp V.B.5.1-V.B.5.25) **Using evaluation and feedback to improve performance.** Ketcham, S. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

Training programs throughout the nuclear industry have undergone considerable changes in the last several years. TMI caused the authors to go back and take a hard look at existing training and make modifications where necessary to conform to new regulatory requirements. INPO, through the performance-based training concept, has had them again go back and look at their training to ensure that each identified performance task is addressed. Because of these and other related requirements, they believe that all of their training programs have improved. However, to ensure that these programs continue to provide relevant and meaningful training, evaluation and feedback must be an integral part of the process.

32737 (CONF-870406—, pp VI.1.1) **Questionnaire measuring training's impact.** Corfield, R.A. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

A questionnaire has been prepared to evaluate the impact of training of a nuclear power plant. Items covered are the degree to which training is systematic, the influence that should be exerted by INPO, and the costs of an effective training program.

32738 (CONF-870406—, pp VI.3.1-3.6) **Initiatives in training program evaluation outside the nuclear utility industry.** Allen, C.J. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

Training literature is reviewed, and program evaluative practices outside the nuclear utility industry are reported. The findings indicate some innovations in philosophy and practice and program evaluation, although not necessarily in the context of evaluation as a route to assessing the impact of training. Program evaluation is described in the context of the impact of training, suggesting continued efforts to accept a multivariate concept of individual and organizational performance.

32739 (CONF-870406—, pp VI.5.1-VI.5.12) **Evaluating performance measures to determine training effectiveness.** Klemm, R.W.; Feiza, A.S. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

This research was conceived and dedicated to helping the CECo training organization become a more integrated part of the corporate business. The target population for this study was nuclear and fossil generating station employees who directly impacted the production of electricity. The target sample (n = 150) included: instrument, mechanical, and electrical maintenance personnel; control room operators; engineers, radiation chemists, and other technical specialists; and equipment operators and attendants. A total of four instruments were utilized by this study. Three instruments were administered to the generating station personnel. These included a demographic form, a learning style profile, and a motivational style profile. The focal instrument, a performance skills rating form, was administered to supervisory personnel. Data analysis consisted of three major parts. Part one established internal consistency through Cronbach alpha statistics. Part two provides summary statistics and breakdown tables for important variables. Part three provides inferential statistics responding to the research questions. All six Performance Skills variables discriminated significantly between the trained and non-trained groups (p .001). In all cases, the mean value for the trained group exceeded the mean value for the non-trained group. Implications for further research indicate that training does have a quantifiable effect on job performance.

32740 **(DOE/ID/01570—T148) Idaho National Engineering Laboratory: Annual report, 1986.** (Idaho National Engineering Lab., Idaho Falls (USA)). 1986. Contract AC07-76ID01570. 59p. NTIS, PC A04. File Number DE87009755.

The INEL underwent a year of transition in 1986. Success with new business initiatives, the prospects of even better things to come, and increased national recognition provided the INEL with a glimpse of its promising and exciting future. Among the highlights were: selection of the INEL as the preferred site for the Special Isotope Separation Facility (SIS); the first shipments of core debris from the Three Mile Island Unit 2 reactor to the INEL; dedication of three new facilities - the Fluorinel Dissolution Process, the Remote Analytical Laboratory, and the Stored Waste Experimental Pilot Plant; groundbreaking for the Fuel Processing Restoration Facility; and the first IR-100 award won by the INEL, given for an innovative machine vision system. The INEL has been assigned project management responsibility for the SDI Office-sponsored Multimegawatt Space Reactor and the Air Force-sponsored Multimegawatt Terrestrial Power Plant Project. New Department of Defense initiatives have been realized in projects involving development of prototype defense electronics systems, materials research, and hazardous waste technology. While some of our major reactor safety research programs have been completed, the INEL continues as a leader in advanced reactor technologies development. In April, successful tests were conducted for the development of the Integral Fast Reactor. Other 1986 highlights included the INEL's increased support to the Office of Civilian Radioactive Waste Management for complying with the Nuclear Waste Policy Act of 1982. Major INEL activities included managing a cask procurement program, demonstrating fuel assembly consolidation, and testing spent fuel storage casks. In addition, the INEL supplied the Tennessee Valley Authority with management

and personnel experienced in reactor technology, increased basic research programs at the Idaho Research Center, and made numerous outreach efforts to assist the economies of Idaho communities.

32741 **(IAEA-TECDOC—397) Potential of low-temperature nuclear heat applications. Report of the advisory group meeting held in Wuerenlingen, Switzerland, 9-13 September 1985.** (International Atomic Energy Agency, Vienna (Austria)). Dec 1986. 46p. (CONF-8509388—Summ.). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702283.

From Advisory group meeting on potential of low-temperature nuclear heat applications; Wuerenlingen, Switzerland (9 Sep 1985).

At present, more than one third of the fossil fuel currently used is being consumed to produce space heating and to meet industrial needs in many countries of the world. Imported oil still represents a large portion of this fossil fuel and despite its present relatively low price future market evolutions with consequent upward cost revisions cannot be excluded. Thus the displacement of the fossil fuel by cheaper low-temperature heat produced in nuclear power plants is a matter which deserves careful consideration. Technico-economic studies in many countries have shown that the use of nuclear heat is fully competitive with most of fossil-fuelled plants, the higher investment costs being offset by lower production cost. Another point in favour of heat generation by nuclear source is its indisputable advantage in terms of benefits to the environment. The IAEA activity plans for 1985-1986 concentrate on information exchange with specific emphasis on the design criteria, operating experience, safety requirements and specifications of heat-only reactors, co-generation plants and existing power plants backfitted for additional heat applications. The information gained up to 1985 was discussed during the Advisory Group Meeting on the Potential of Low-Temperature Nuclear Heat Applications held in the Federal Institute for Reactor Research, Wuerenlingen, Switzerland in September 1985 and, is included in the present Technical Document. 5 figs, 5 tabs.

2101 Power Reactors, Non-breeding, Light-water Moderated, Boiling Water Cooled

REFER ALSO TO CITATION(S) 32813, 32815, 32874, 32891, 32951, 32991, 33002, 33005, 33007, 33010, 33014, 34403, 34445

32742 (CONF-870406—, pp II.3.1-II.3.9) **Training and plant performance: a strategic planning partnership.** Coe, R.P. (GPU Nuclear Corp., Parsippany, NY). Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

The nuclear industry as a whole, and specifically GPU Nuclear, is refocusing its attention on performance indicators. This standardized assessment of plant operational performance surfaces numerous examples of how performance-based training positively impacts plant performance. Numerous examples of high dollar savings range from scram reduction programs to reducing personnel rem exposures. The deeper the authors look the more they find that training is making a difference. The question now is, how long can they continue to afford the ever increasing demands of the pursuit of excellence. Early in 1985, the Training & Education Department at GPU Nuclear proactively began its strategic planning effort in order to address the increasing industry initiatives while facing flat or reduced commitments of resources. The Training Strategic Plan addresses detailed plans for each of the following areas: curriculum planning; program development; training & education organizational structure; training & education administrative procedures; training advisory structure and priority process; financial strategies. All of the above strategies are designed to assure training effectiveness. With the nuclear option under such strong public scrutiny, it is in the best interest of all of the nuclear utilities to assure the most cost effective approach to successful operation while achieving their standards of excellence.

32743 (CONF-870406—, pp V.A.3.1-V.A.3.16) **Development of BWR and PWR event descriptions for nuclear facility simulator training.** Carter, R.J.; Bovell, C.R. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

A number of tools that can aid nuclear facility training developers in designing realistic simulator scenarios have been developed. This paper describes each of the tools, i.e., event lists, events-by-competencies matrices, and event descriptions, and illustrates how the tools can be used to construct scenarios.

32744 (CONF-870406—, pp V.A.4.1-V.A.4.6) **Maintenance training - a modern necessity.** Bushall, W. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

In recent years, there has been an increase in technically advanced systems and equipment and a need for highly skilled and knowledgeable maintenance technicians to maintain them. To implement an effective training program, training groups' and plant staffs' key to success must be cooperation and creativity. This paper deals with plant staff interface and how to effectively conduct performance-based training while holding the line on costs. This paper includes cost effective and innovative measures to produce performance-based training for maintenance disciplines including: Using the plants staff as a resource as subject matter experts in the development and verification of training materials. Using the plant staff as a resource for the construction of training aids. Using salvage and surplus to produce high quality, low cost training aids. Using cutaways for better understanding of he theory of equipment operation. These cost saving practices are currently being used at Gulf States Utilities' River Bend Nuclear Station.

32745 **(CONF-870406—1) Development of BWR [boiling water reactor] and PWR [pressurized water reactor] event descriptions for nuclear facility simulator training.** Carter, R.J.; Bovell, C.R. (Oak Ridge National Lab., TN (USA); Physics Applications, Inc., Chattanooga, TN (USA)). 1987. Contract AC05-84OR21400. 17p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87006208.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

A number of tools that can aid nuclear facility training developers in designing realistic simulator scenarios have been developed. This paper describes each of the tools, i.e., event lists, events-by-competencies matrices, and event descriptions, and illustrates how the tools can be used to construct scenarios.

32746 **(CONF-8611120—2-Summ.) Technical basis for hydrogen-water chemistry: Laboratory studies of water chemistry effects on SCC [stress-corrosion-cracking].** Kassner, T.F.; Ruther, W.E.; Soppet, W.K. (Argonne National Lab., IL (USA)). Oct 1986. Contract W-31109-ENG-38. 10p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87004755.

From Seminar on BWR corrosion, chemistry, and radiation control; Palo Alto, CA, USA (10 Nov 1986).

The influence of different impurities, viz., oxyacids and several chloride salts, on the stress-corrosion-cracking (SCC) of sensitized Type 304 stainless steel (SS) was investigated in constant-extension-rate-tensile (CERT) tests in 289°C water at a low dissolved-oxygen concentration (<5 ppB). Cyclic loading experiments on fatigue precracked fracture-mechanics-type specimens of this material and Type 316NG were also performed at 289°C in low-oxygen environments with and without sulfate at low concentrations. In these experiments, the crack growth behavior of the materials was correlated with the type and concentration of the impurities and the electrochemical potentials of Type 304 SS and platinum electrodes in the simulated hydrogen-water chemistry environments. The information suggests that better characterization of water quality, through measurement of the concentrations of individual species (SO_4^{2-}, NO_3^-, Cu^{2+}, etc.) coupled with measurements of the corrosion and redox potentials at high temperatures will provide a viable means to monitor and ultimately improve the performance of BWR system materials.

32747 **(EPRI-NP—4990-Vol.1) Thermal performance diagnostic manual for nuclear power plants: Volume 1, Development of thermal performance diagnostic manual: Final report.** Finnicum, D.J.; Webber, R.C. (Combustion Engineering, Inc., Windsor, CT (USA). Nuclear Power Systems Div.; Electric Power Research Inst., Palo Alto, CA (USA)). Apr 1987. 54p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920414.

The Thermal Performance Diagnostic Manual is intended to be a tool that will assist the utilities in determining the cause of loss megawatts. This manual consists of a generic PWR performance diagnostic tree, a generic BWR performance diagnostic tree, guidelines for converting the generic trees to plant specific trees and instructions on how to use the performance diagnostic trees. Volume 1 of this report describes the process by which the performance diagnostic trees were developed.

32748 **(HEDL-SA—3400) Trend curve data development and testing.** McElroy, W.N.; Gold, R.; Simons, R.L.; Roberts, J.H. (Hanford Engineering Development Lab., Richland, WA (USA); Metrology Control Corp., Richland, WA (USA)). 1986. Contract AC06-76FF02170. 63p. (CONF-860605—39). NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87004086.

From 13. international symposium on the effects of radiation on materials; Seattle, WA, USA (23 Jun 1986).

Existing trend curves do not account for previous and more recently observed test and power reactor flux-level, thermal neutron and γ-ray field-induced effects. Any agreement between measured data and trend curve predictions that does not adequately represent the important neutron environmental and temperature effects as well as the microstructural damage processes, therefore, could be fortuitous. Empirically derived end-of-life (EOL) and life-extension-range (LER) trend curves are presented and discussed in this paper for high temperature [~288°C (550°F)] irradiation of two weld, two plate, and two forging pressure vessel (PV) steels and low-temperature [~60°C (140°F)] irradiation of one support structure-type steel.

32749 (INIS-mf—10889, pp 40) **Phase transformation of ionic salts in nuclear reactor radiation field.** Jakes, D.; Rosenkranz, J. (Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

32750 **(NUREG—0020-Vol.10-No.8) Licensed operating reactors: Status summary report, data as of 07-31-86.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Information Resources Management). Dec 1986. 439p. NTIS, PC A19/MF A01 - GPO. File Number TI87900841.

The Operating Units Status Report - Licensed Operating Reactors provides data on the operation of nuclear units as timely and accurately as possible. This information is collected by the Office of Resource Management from the Headquarters staff of NRC's Office of Inspection and Enforcement, from NRC's Regional Offices, and from utilities. The three sections of the report are: monthly highlights and statistics for commercial operating units, and errata from previously reported data; a compilation of detailed information on each unit, provided by NRC's Regional Offices, IE Headquarters and the utilities; and an appendix for miscellaneous information such as spent fuel storage capability, reactor-years of experience and non-power reactors in the US. It is hoped the report is helpful to all agencies and individuals interested in maintaining an awareness of the US energy situation as a whole.

32751 **(NUREG—1235) Technical Specifications: Clinton Power Station, Unit No. 1 (Docket No. 50-461): Appendix "A" to License No. NPF-62.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation). Apr 1987. 558p. NTIS, PC A24/MF A01 - GPO. File Number TI87900641.

The Clinton Power Station, Unit No. 1 Technical Specifications were prepared by the US Nuclear Regulatory Commission to set forth limits, operating conditions, and other requirements applicable to a nuclear reactor facility as set forth in Section 50.36 of 10 CFR 50 for the protection of the health and safety of the public.

32752 **(NUREG/CR—4219-Vol.3-No.2) Heavy-Section Steel Technology Program: Semiannual progress report for April-September 1986.** Pugh, C.E. (Oak Ridge National Lab., TN (USA)). Dec 1986. Contract AC05-84OR21400. 233p. (ORNL/TM—9593-Vol.3-No.2). NTIS, PC A11/MF A01 - GPO. File Number TI87003566.

The Heavy-Section Steel Technology (HSST) Program is an engineering research activity conducted by the Oak Ridge National Laboratory for the Nuclear Regulatory Commission. The program comprises studies related to all areas of the technology of materials fabricated into thick-section primary-coolant containment systems of light-water-cooled nuclear power reactors. The investigation focuses on the behavior and structural integrity of steel pressure vessels containing cracklike flaws. Current work is organized into ten tasks: (1) program management; (2) fracture-methodology and analysis; (3) material characterization and properties; (4) environmentally assisted crack-growth studies; (5) crack-arrest technology; (6) irradiation effects studies; (7) cladding evaluations; (8) intermediate vessel tests and analysis; (9) thermal-shock technology; and (10) pressurized thermal-shock technology.

32753 **(NUREG/CR—4877) Assessment of design basis for load-carrying capacity of weld-overlay repairs.** Scott, P.M. (Battelle Columbus Labs., OH (USA); Nuclear Regulatory Commission, Washington, DC (USA). Div. of Engineering Safety). Apr 1987. 80p. (BMI—2150). NTIS, PC A05/MF A01 - GPO. File Number TI87900636.

This study was conducted to assess the current load-carrying capacity design basis for weld-overlay repairs (WORs). Although not specifically addressed in it, the design of WORs is in the spirit of the ASME Boiler and Pressure Vessel Code, Section XI, Article IWB-3640. NUREG-0313 Revision 2 provides guidance for the implementation of the procedures outlined in IWB-3640. However, neither of these documents specifies the values for diameter or thickness which are to be used in the WOR design analysis. Throughout this report we have used the combined thickness and diameter of the repaired cross section to calculate the membrane and bending stresses. The maximum stress from each of the four WOR pipe experiments conducted was significantly higher than that predicted by the IWB-3640 analysis for the design guidelines set forth in NUREG-0313 Revision 2 for a Standard overlay; the average failure stress was approximately 30% higher than the IWB-3640 predicted failure stresses. Consequently the actual safety factors were 30% higher than safety factors used in the Code. For a Standard overlay, the flaw size considered in the analysis is completely through the original pipe wall for the entire circumference of the pipe. Such an overlay would be suitable for long-term plant operation. If actual flaw dimensions were used in the design analysis, then in two of the four experiments the maximum stress was less than that predicted by the IWB-3640 Source Equations. The greatest difference showed that the actual safety factor was 8% lower than the Code safety factor. For the flaw sizes evaluated in this study, an overlay design based on actual flaw dimensions would be considered a Limited Service overlay, suitable only for short-term plant operation, not to exceed one fuel cycle.

32754 **Real-time SAFT system applied to the ultrasonic inspection of nuclear reactor components.** Hall, T.E.; Doctor, S.R.; Reid, L.D. (Pacific Northwest Lab., Richland, WA). pp 509-517 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY: Plenum Press (1987). (CONF-8608142—). Contract AC06-76RL01830.

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

SAFT-UT has evolved in recent years to become a viable real-time acoustical imaging method. A variety of configurations have been developed to accommodate various geometrical requirements and provide full-volume focusing capability. The single transducer, pulse-echo configuration provides a straight-forward configuration for imaging volumetric defects, and for reliably detecting strong corner-trap signals from vertical defects. The tandem SAFT

configurations provide a means for sizing vertical defects and the TSAFT-2 technique, in particular, performs well for imaging the full vertical object plane. These results, along with the development of real-time processing, have moved SAFT-UT from a laboratory-imaging method to a field-usable inspection technique.

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REFER ALSO TO CITATION(S) 32743, 32745, 32747, 32748, 32749, 32750, 32752, 32754, 32813, 32815, 32844, 32852, 32853, 32856, 32857, 32859, 32860, 32861, 32862, 32863, 32864, 32865, 32866, 32867, 32868, 32869, 32874, 32891, 32893, 32894, 32896, 32897, 32899, 32900, 32901, 32905, 32906, 32907, 32915, 32922, 32933, 32937, 32942, 32943, 32945, 32952, 32960, 32961, 32962, 32963, 32964, 32966, 32967, 32968, 32986, 32987, 32988, 32990, 32991, 32992, 32996, 32997, 32999, 33002, 33008, 33014, 33150, 33335, 33675, 34403, 34445

32755 (CONF-870406—, pp II.1.1-II.1.11) **Impact of accreditation on Public Service Gas and Electric Co.** Hanson, H.D. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

Public Service Electric and Gas Company (PSE & G) became a member of the National Academy of Training when the last five programs for its Salem Nuclear Generating Station received INPO accreditation in November of 1985. In June of 1986, the NRC conducted a post-accreditation visit at the PSE & G Nuclear Training Center. In March of 1987, the biannual report for the first five programs to be accredited was submitted. The development and conduct of training programs, based on a detailed analysis of position task requirements, complemented with plant-specific, performance-based evaluation of trainee performance; has had a positive impact on station performance and appearance, as well as worker attitude and capability. Communication between station and Nuclear Training Department management is stronger; and a clearer understanding of the roles, responsibilities, and accountabilities of each has occurred. Lessons learned, activities relating to the maintenance of accreditation, and the seeking of accreditation for a newly licensed nuclear plant, Hope Creek, are discussed in the paper.

32756 (CONF-870406—, pp III.A.5.1-III.A.5.10) **Training department's role in human factor analysis during post-trip reviews.** Goodman, D. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

Provide training is a frequent corrective action specified in a post-trip review report. This corrective action is most often decided upon by technical and operational staff, not training staff, without a detailed analysis of whether training can resolve the immediate problem or enhance employees' future performance. A more specific human factor or performance problem analysis would often reveal that training cannot impact or resolve the concern to avoid future occurrences. This human factor analysis is similar to Thomas Gilbert's Behavior Engineering Model (Human Competence, McGraw-Hill, 1978) or Robert Mager's/Peter Pipe's Performance Analysis (Analyzing Performance Problems, Pitman Learning, 1984). At Palo Verde Nuclear Generating Station, training analysts participate in post-trip reviews in order to conduct or provide input to this type of human factor and performance problem analysis. Their goal is to keep provide training out of corrective action statements unless training can in fact impact or resolve the problem. The analysts follow a plant specific logic diagram to identify human factors and to identify whether changes to the environment or to the person would best resolve the concern.

32757 (CONF-870406—, pp IV.A.1.1-IV.A.1.35) **Generic modeling: enhancing the productivity of traditional ISD methods and practices.** Zwissler, G.E.; Smith, P.E. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

Since the results of task analysis are essential to writing learning objectives, defining program content and preparing job performance measures, project managers traditionally have had two options for dealing with this requirement: 1) Conduct Task Analysis - schedule the time and commit the resources to complete this activity in the traditional manner, or 2) Omit Task Analysis - develop instructional materials without the requisite core information provided by the analysis. In response to the need for a task analysis in support of systems training for plant operators at San Onofre Nuclear Generating Station (SONGS), an alternative task analysis process was developed to meet the constraints of limited project time and resources. The process, based on generic modeling, identifies task analysis data which applies across groupings of tasks for most plant systems. Generic models represent the knowledge and skills required for the operation of any plant system. These knowledge and skills are comprehensive and are derived from an analysis of the operating requirements of a typical plant system. When applied to the task analysis process, these system operating requirements are equivalent to groups of tasks logically organized by their commonalities. Attributes, common to all tasks within each group, provide the essential operating requirements for each system. A generic model is created by validating and sequencing these similarities into an order which represents the training needed by the operator to successfully perform the tasks associated with the system for which training is being prepared.

32758 (CONF-870406—, pp IV.A.7.1-IV.A.7.8) **Bringing it home: making nuclear power plant training relevant.** Billings, H.C.; Hajek, B.K.; Puffenberger, S.F. (Boston Edison Co., Plymouth, MA). Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

In 1985, a new series of multi-image training modules was created for the Pilgrim Nuclear Power Station's General Employee Training (GET) program. In the year since its initial delivery, the multi-image component of GET has been highly praised by both Boston Edison management and INPO. Most importantly, the multi-image modules, along with a newly implemented curriculum have increased the effectiveness of GET at Pilgrim.

32759 (CONF-870406—, pp VI.2.1-VI.2.4) **Payback on our training investment.** Nichols, W.A. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

A tremendous amount of resources have been invested in training over the past few years. The return on the training investment will be evident over the next several years. The return will be in the form of financial savings to companies and improved performance of personnel. At the Cook Plant, the authors expect the return to outweigh the investment.

32760 **(CONF-870501—2) Application of the LEPRICON methodology to LWR pressure vessel surveillance dosimetry.** Maerker, R.E. (Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 22p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009675.

From 6. ASTM-Euratom symposium on reactor dosimetry; Jackson Hole, WY, USA (31 May 1987).

A second example of applying the LEPRICON methodology to an existing pressurized water reactor is described. The present application is an analysis of ad hoc dosimetry inserted into the H.B. Robinson-2 reactor to monitor the effects on pressure vessel fluence produced by the introduction of a low-leakage fuel management scheme during cycle 9. The use of simultaneous dosimetry at both a downcomer location and in the reactor cavity allows a quantitative evaluation to be made by the LEPRICON procedure of the relative merits of each location, and the cavity location is found to be superior.

32761 (EPRI-NP—4929, pp A2.1-A2.28) **Prairie Island Nuclear Generating Plant steam generator owners group II: examination of 3 tubes removed from steam generator No. 12.** Kuchirka, P.; Madeyski, A.; Pearson, R. (Westinghouse Corp.). Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

The No. 12 steam generator at Prairie Island Unit 1 has experienced some degradation of the hot leg tubes within the tube sheet region. The history of the degradation is given. A comparison of the rate of degradation of No. 12 steam generator with similar rates at Point Beach and Ginna is presen. The No. 11 steam generator has not experienced similar degradation. To investigate the cause and degree of degradation and to obtain correlation of field eddy current (EC) indications with actual conditions, the three hot leg tube segments were removed from the No. 12 steam generator for laboratory EC testing and destructive examination. Two of the tubes had field EC indications in the tube sheet region and one was apparently free of indications. The results of the testing and examinations are given. These tests showed that the lab EC correlated well with the destructive exam, but the field EC did not. The lab EC detected defects that are >35% thru wall, whereas the field EC detected defects that are >80%. The principle degradation was intergranular stress corrosion cracking in the tube sheet region with some uniform intergranular attack. The clean tube had randomly distributed IGA with a maximum depth of 15%. tube/tube sheet deposit chemical analysis does not support the existence of a caustic environment. The conclusions of this work are given.

32762 (EPRI-NP—4929, pp A3.1-A3.32) **Jose Cabrera (Zorita) tube examination.** Kuchirka, P.J. (Westinghouse Electric Corp.). Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

Jose Cabrera (Zorita) tube examination procedures are discussed. This plant continues to use phosphate water chemistry (sodium/phosphate ratio = 2.1). Three hot leg tube segments were pulled from the Jose Cabera (Zorita) plant in 1985. One tube had a field EC indication on the OD at the first tube support plate and the other two had field EC indications on their ID about 3 inches above the bottom of the tube sheet. All three tubes were initially sent to Battelle for preliminary NDE and decontamination. Segments of two tubes were sent to Westinghouse for destructive examination. The results of the laboratory eddy current and radiographic examinations are given. The results of the visual examinations are also given. The tube with OD indications was destructively examined and shallow intergranular pitting and intergranular attack, up to 2 mils deep, were found on the OD in the tube sheet region. Local areas of IGA, up to 5 mils deep, were found on the OD within the tube support plate region. A summary of this information together with supporting micrographs is given. It was hypothesized that a caustic crevice environment was the cause of this mild degradation. Shallow areas of thinning or wastage, up to 3 mils, were found just above the top of the tube sheet in the sludge pile region. Even more shallow wastage was found at the edges of support plate locations. This wastage is believed to be the remnant of early plant chemistry when a higher sodium/phosphate ratio and higher phosphate concentration were allowed.

32763 (EPRI-NP—4929, pp A4.1-A4.16) **Examination of a steam-generator tube section from the Zorita nuclear plant.** Stiegelmeyer, W.N.; Agrawal, A.K. (Battelle Columbus Div., OH). Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

One of the Zorita tubes (R18C43 HL) with the field EC indications on the ID was nondestructively and destructively examined. Also, deposits from the outside of the R18C53 HL were analyzed by several microchemical methods. The results of eddy current, radiography and dye penetrant examinations are given. Axial cracks, up to 80% thru wall, were found on the ID at the roll transition by dye penetrant exams. Similar OD tube sheet region intergranular attack (IGA), tube support plate region IGA and above tube sheet wastage were found as with tube R18C53 HL examined by Westinghouse. The microstructure of the tube R18C43 is shown. The results of a spark source mass spectroscopy (SSMS) analysis of deposits are given. This analysis indicates that the Na/P was >3 in the tube sheet crevice region sample and was <3 for the sample taken from the tube surface. An X-ray diffraction analysis performed on the core and surface samples showed that the deposits were primarily magnetite and copper with a mixture of phosphate compounds. The conclusions of this work are given. Free caustic was considered the likely cause of the OD surface IGA detected. High stresses in the roll transition were likely responsible for the ID axial cracks.

32764 (EPRI-NP—4929, pp A5.1-A5.13) **Status of IGA in Japanese plants and results of S/G pulled tube examinations.** Takamatsu, H. (Kansai Electric Power Co. Inc., Osaka, Japan). Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

Currently there are 14 operating PWRs in Japan. Five of the plants have been affected by the intergranular stress corrosion cracking (IGSCC). The experience of the 14 plants with regard to tube plugging is summarized. The five affected plants are: Mihama 2, Takahama 1, Takahama 2, Ohi 1 and Genkai 1. The first two plants experienced IGSCC in the tube sheet crevice region (55 and 124 tubes plugged) and a slight problem with IGSCC in tube support plate crevices (13 and 8 tubes plugged). The other three plants have experienced extensive IGSCC in their tube support plate crevices (1330, 773 and 667 tubes plugged, respectively). The Japanese consider that their IGSCC (IGA) problem is caused by a combination material and environmental factors. All three factors must be present for attack to take place. If the two environmental factors can be controlled, then the attack will stop. The preventive measures being employed by the Japanese are given. These include: prevention of free caustic (i.e., sludge lancing, crevice cleaning, boron injection and improvement in water treatment) and maintenance of deoxidation environment (i.e., hydrazine soaking before operation and enriching the concentration of hydrazine in the secondary water).

32765 (EPRI-NP—4929, pp A6.1-A6.14) **Failure analysis: tube R20L84, B steam generator, Fort Calhoun.** Craig, K.R. (Combustion Engineering, Windsor, CT). Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

A failure analysis of tube R20L84 from the B steam generator of the Fort Calhoun Reactor is presented. A large (> 100 gpm) primary to secondary leak occurred during post refueling heatup in the B steam generator. A schematic diagram of the steam generator is shown. Results are presented of the field investigations, laboratory failure analysis, and experimental testing that were used to identify the cause of the tube failure as intergranular stress corrosion cracking (IGSCC). The failure occurred in the tube at its intersection with vertical support straps. The failed tube was significantly deformed as a result of corrosion of the vertical support straps and was generally oval in shape. The tube deformation caused high tensile stresses on the tube OD. A summary of the examinations and analyses of the tube and deposits is given. Light optical microscopy (LOM) revealed that the crack was OD initiated, entirely intergranular and that there was no evidence of general IGA on either surface of the tubing. Attempts to measure the pH of local deposits proved inconclusive. Computer simulation of the effects of concentrating condenser cooling water (Missouri River) indicates that crevice regions will contain a solution with alkaline pH as compared to the bulk water pH by as much as 2.9 pH units. Experimental testing was performed using Combustion Engineering's Tube Sheet Crevice Simulation Apparatus (TCSA). The results of these tests show that a nonprotective magnetite can form and cause tube denting in AVT environments. IGSCC has been produced in the laboratory as a result of the tube denting. Consequently, For Calhoun has concluded that magnetite formation on the vertical support straps caused denting of the failed tube that then resulted in IGSCC.

32766 (EPRI-NP—4929, pp A7.1-A7.17) **Investigation of the tube sheet samples removed from the retired Surry steam generator.** Bradley, E.R.; Clark, R.A.; Kurtz, R.J. (Pacific Northwest Lab., Richland, WA). Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.). Contract AC06-76RL01830.

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

An investigation of tube sheet samples removed from the retired Surry 2 steam generator is described. One of the steam generators removed from the Surry 2 plant has and is undergoing extensive nondestructive and destructive examination of the tubing. 320 tubes were selected as part of a round robin eddy current examination using a variety of probes and data acquisition systems. All teams identified defects in a large number of tubes just above the top of the tube sheet (TTS) in the hot leg, but did not define the type of defect. Only one team identified intergranular attack (IGA) in 20 tubes within the tube sheet crevice region. To validate the NDE results hot and cold leg tubes were pulled. The cold leg tubes have a heavy copper coating and have not yet been examined. Shallow IGA, about 10 micrometers deep, was present on the tube OD surface at 50 to 75 mm below the TTS. Also, at the TTS circumferentially oriented crack-like defects were found in one tube. Half ring samples for examination by scanning electron microscopy and optical metallography were removed from two tubes. The circumferentially oriented crack-like defect was found to be overlapping pitting and general corrosion (wastage). There was no evidence of IGA associated with the circumferential defects. Tube sheet sections containing nine Alloy 600 tubes in a 3 by 3 array were removed for detained metallurgical examinations to validate NDE results and establish the corrosion conditions within the tube sheet and sludge pile regions.

32767 (EPRI-NP—4929, pp B1.1-B1.6) **Approach to crevice chemistry inferences.** Sawochka, S.G.; Hook, T.A.; Choi, S.S. Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

An approach to crevice chemistry inferences is presented. NWT reviewed the ionic species return after plant cooldown data for twelve PWRs. The data are limited since, generally, only data for sodium, magnesium and calcium cations, and chloride and sulfate anions are included. The solution chemistries were reviewed with respect to cation to anion equivalence ratios based on the following assumptions: all sodium, potassium, chloride and fluoride remain soluble; sulfate precipitates to the extent that calcium is present with residual sulfate remaining soluble; and all remaining calcium and magnesium precipitates as silicates. Plant chemistries were inferred as basic if their cation to anion equivalence ratio was greater than about 1.2 and acidic if the ratio was less than about 0.8. The total return chemistries after shutdown for various outages for the twelve plants were identified. The inferred pH conditions are also identified for each of those outages. These inferred pH conditions were then compared with the occurrence of intergranular attack (IGA) and intergranular stress corrosion cracking (IGSCC) in the plants' steam generators. The occurrence of IGA and IGSCC appeared to correlate with an inferred pH that was basic. Plants with acidic conditions or with basic conditions and a phosphate buffer did not experience this corrosion.

32768 (EPRI-NP—4929, pp B2.1-B2.6) **Review of plant blowdown data to determine the significant factors in IGA.** Cohen, P. Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

A review of plant blowdown data to determine the significant factors in intergranular attack (IGA) is presented. The assumptions of this review are; (1) IGA is caused by specific corrosive environments and (2) existing concentration mechanisms are of unknown magnitude, but are large enough to achieve the required concentration. Steam generator blowdown chemistry data were reviewed for three plants and the cation (sodium) to anion (chloride plus sulfate) equivalence ration was found to correlate with the occurrence of IGA. The plant with a ratio of 3.9 experienced heavy IGA, whereas, the plant with a 0.3 ratio had no IGA. The chemistry data and summary of results are presented. There were no obvious correlations of IGA with level of ionic impurities, specific ion present or type of condensate polishing used. Based on this limited study it is recommended that: the salt content of blowdown be maintained as low as practical, the operations be modified to achieve neutral or slightly acidic cation to anion equivalence ratio, and boric acid be considered as a neutralizer for alkaline forming boiler waters.

32769 (EPRI-NP—4929, pp B3.1-B3.4) **Utility reports on hideout return.** Brobst, G. Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

The goals of utility reports on hideout return data should be to combine the knowledge of the research community with the chemistry and operating knowledge available from the utilities and to keep the information exchange active in order to develop and support remedial action programs. The past plant hideout return data were limited. The utility data was not uniform nor complete. This was partly because the analytical work was beyond the capabilities of the typical plants. Accordingly, most data were taken and compiled by contractors. However, the plant transients of interest often occurred when the contractors were not present and the collected data were not comprehensive. In recent years, plants have upgraded their inhouse analytical equipment, sampling and analysis procedures, and personnel. The ion chromatography performed at most plants yields good results on many species at low concentrations. Also, improved data acquisition and assimilation systems/equipment have greatly enhanced the ability of technical personnel to review reduced chemistry data. The data of interest includes: chemistry data at different power levels, chemistry data at different steam generator temperatures, and chemistry data during shutdown power reductions and temperature decreases. The steam generator blowdown flow is a critical factor in assessing the hideout return.

32770 (EPRI-NP—4929, pp B4.1-B4.13) **Utility reports on hideout return of Japanese PWRs.** Sato, M. (Mitsubishi Heavy Industries). Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

A detailed hideout return chemistry program was initiated in late 1984 to investigate the differences between plants experiencing intergranular stress corrosion cracking (IGSCC) at tube support plate locations and those that do not. Four plants with IGSCC and five without IGSCC are included in the program. The data collection phase of the program will be completed by the end of 1985 and the data evaluation will be performed in early 1986. The program status is presented. Preliminary data were presented for three IGSCC plants and four non IGSCC plants. There appears to be a strong correlation between the cation to anion equivalence ratio and the occurrence of IGSCC. The plants with OGSCC have a significantly higher ratio than those not experiencing IGSCC (i.e., ranging from 2.3 to 15 for IGSCC plants to 0.9 to 1.1 for non IGSCC plants). Data for these seven plants are presented for the concentration of various species as a function of power level and time after power reduction. Based on these data, it was concluded that Na, K, Ca, F and Cl seem to be retained in the crevices as ions in solution during power operation. Ca, Mg and SO_4 seem to be retained as precipitates during power operation.

32771 (EPRI-NP—4929, pp B5.1-B5.19) **Prairie Island Nuclear Generating Plant steam generator hideout return data from Unit 1, January 1985 and from Unit 2, September 1985.** Gatten, T.; Pearson, R. (Northern States Power Co.). Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

Hideout return data are presented for a Unit 1 shutdown that occurred on January 10, 1985, and a Unit 2 shutdown on September 5, 1985. The data are presented as the concentrations of various species as a function of power level, time after power reduction, and primary water temperature. The concentrations of sodium, chloride and sulfate were monitored during the Unit 1 shutdown. In general, the Unit 1 data show that hideout return starts after reactor shutdown and increases with decreasing primary water temperature. The sodium and chloride concentrations increased gradually with decreasing temperature. The sulfate concentration showed a sharp increase with decreasing temperature, perhaps due to retrograde solubility. The maximum concentrations of sodium, chloride and sulfate in each steam generator, and the temperature at which it occurred are identified. The Unit 2 results were similar to the Unit 1 results. In addition, the concentrations of calcium and magnesium showed a sharp increase with decreasing temperature, similar to that of sulfate. Silica showed a gradual increase with decreasing temperature. The maximum concentrations of sodium, silica, chloride, sulfate, calcium and magnesium in each steam generator, and the temperature at which it occurred are identified.

32772 (EPRI-NP—4929, pp B6.1-B6.6) **Union Electric - Callaway Plant: steam generator hideout return test.** Shanks, V.J. Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

A description of the hideout return test performed at the Callaway plant is presented. The purpose of this test was to determine what hideout return characteristics the Model F steam generator would have with full flow condensate polisher operation. The steam generator with the worst previous chemistry operating data (i.e., the C S/G) was selected for this test. The chemistry data are given and are plotted as a function of time. The conclusions of this test are summarized as: no significant return was measured during power reduction; concentrations started to increase as the steam generator temperature was reduced; the correlation between cation conductivity and sulfate concentration followed predicted values indicating that there were no unaccounted for ions present; the rate of hideout return was much slower than expected; and approximately 0.19 pounds of sulfate was removed from steam generator C with the suspected source being the condensate polishers.

32773 (EPRI-NP—4929, pp B7.1-B7.12) **Duke Power Company - McGuire Nuclear Station: steam-generator hideout return and cleanup.** Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

McGuire Nuclear Station steam generator hideout return and cleanup are discussed. Hideout return data are presented for Unit 1 shutdowns that occurred on November 23, 1984, and April 19, 1985, and a Unit 2 shutdown on January 25, 1985. The data are presented as the concentrations of various species as a function of time after power reduction and primary water temperature. The steam generator blowdown as a function of time after power reduction is also presented. The concentrations of sodium, potassium, calcium, magnesium, aluminum, iron, and copper cations, and chloride, fluoride, sulfate, phosphate and nitrite anions were monitored during the each shutdown. Silica was also measured in the two 1985 shutdowns. The return of sulfate, phosphate, calcium and magnesium showed retrograde solubility. Silica concentrations showed an increase as the temperature decreased to about 450 to 500°F and then they decreased as the temperature decreased. McGuire has a holf point at 300 at 350°F to clean up the steam generator secondary water. The return of sulfates should occur within 4 to 6 hours. The blowdown is maximized to reduce the secondary water impurity concentrations. Cleanup continues until the sulfate concentration is reduced to below 100 ppb. At that point cooldown is continued.

32774 (EPRI-NP—4929, pp B8.1-B8.12) **Zion Unit 2 hideout return data.** Zwilling, P.M. (Intergranular Corrosion Workshop, Baltimore, MD). Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

The design features of the Zion plants and their operating histories are identified. Hideout return data were presented for a Unit 2 shutdown that occurred on September 7, 1985. The data include reactor power and primary water temperature as a function of time. Impurity concentrations are given as a function of temperature for silica, sodium, magnesium, chloride and sulfate, respectively. Steam generator blowdown was held constant during this time. Silica, sodium and chloride concentrations peaked at 500°f and then decreased with decreasing temperature. Magnesium concentrations were at a minimum at 500°F and then steadily increased with decreasing temperature to reach a peak at 200°F. Sulfate concentrations were low (i.e., 15 to 35 ppb) during power operation and increased to about 110 to 160 ppb at 500°F. Sulfate slightly decreased with decreasing temperature and averaged about 100 ppb down to a temperature of 200°F. One year ago the sulfate averaged about 300 ppb during the period following shutdown and averaged about 600 ppb two years ago. It is believed that the hideout return studies indicate progress in improved chemistry control.

32775 (EPRI-NP—4929, pp B9.1-B9.12) **Hideout return at Ginna Station.** Dahl, B.A. (Rochester Gas & Electric Corp., New York). Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

Station characteristics are given and the chemistry control is identified. Hideout return data were presented for a normal refueling outage shutdown that occurred on March 1, 1985, a power reduction (to 35%) that occurred on September 22, 1985 and a plant trip and hot standby that occurred on September 28, 1985. These three different types of transients demonstrated how dependent the return from hideout is on the reactor power level and reactor coolant temperature. The composition of the Lake Ontario condenser cooling water and the Ginna normal steam generator chemistry are identified. Results of the studies are presented.

32776 (EPRI-NP—4929, pp B10.1-B10.21) **Rochester Gas and Electric R. E. Ginna Marcy 1985 Crevice flushing program.** Hook, T.A.; Sawochka, S.G.; Harhay, A. Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

The results of the March 1985 tube sheet crevice flushing (TSCF) operations at Ginna are reported. Two different TSCF procedures were used: one using the reactor coolant pumps (RCP) for circulation and the other using natural circulation (NC). These procedures are briefly described. The goals of this program were to monitor and interpret the chemical return, and to compare the two procedures. The natural circulation procedures developed about a 90°F temperature difference between the bulk water and the crevice, whereas, the RCP circulation procedure developed less than a 10°F temperature difference. The flushing program is described. Ten TSCF cycles were performed: six using the RCP procedure (No. 1, 2, 4, 8, 9 and 10) and four using the NC procedure (No. 3, 5, 6 and 7). The flush water contained boric acid during every cycle. The chronology of the flushing program is summarized and the drain volumes during the program are identified. Results of the studies are presented.

32777 (EPRI-NP—4929, pp C1.1-C1.39) **Chemical enhancement of crevice flushing program.** Baum, A.; Prestegiacomo, J. (Westinghouse Electric Corp.). Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

This work concerned the use of chemical enhancement of tube sheet crevice flushing (TSCF) to modify the tube sheet crevice environment in order to retard or stop intergranular attack/intergranular stress corrosion cracking (IGA/IGSCC). The background on TSCF is given. The program objectives were to determine: (1) the suitability of TSCF as a means for accumulating a corrosion inhibitor (i.e., boric acid) in a deep tube sheet crevice and (2) if adding one or more of the following chemicals to the bulk water during TSCF operations can increase its effectiveness: surfactants, dispersants, boric acid, flotation agents, and cleaning agents. The test program description is discussed. The testing was performed in a model boiler with a full depth crevice and tube sheet simulator. Results of the tests are presented.

32778 (EPRI-NP—4929, pp C2.1-C2.35) **Preliminary results of NWT crevice flushing program.** Sawochka, S.G.; Clouse, M.; Hook, T.A. (NWT Corp., San Jose, CA). Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

The tests performed by NWT were considerably different from those performed by Westinghouse. NWT used a flat plate annulus scaled to be similar to a tube sheet crevice. The flat plate simulator was used because of its simple fabrication, ease of preloading and ease of analysis of the crevice contents following a test. The device and the simulator crevice loading is described. Basically, it was loaded with a mixture of magnetite plus 20% sodium chloride or 14% sodium hydroxide having a toothpaste consistency. The TSCF simulations were performed using either pure water, boric acid, a surfactant or a surfactant and boric acid. An outline of the test procedure is presented and a schematic of the test facility is shown. A summary of the crevice flushing results is given.

32779 (EPRI-NP—4929, pp C3.1-C3.43) **IGA rates in neutralized solutions of caustic and organic environments.** Aspden, R.G.; Economy, G.; Kunig, R.H. (Westinghouse Corp.). Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

The objectives of this work were to: establish laboratory test environments consistent with those believed to exist in operating steam generators; produce laboratory IGA specimens consistent with specimens removed from operating plants; and conduct limited remedial action tests designed to arrest intergranular attack (IGA). Various laboratory tests performed by Westinghouse are summarized. Tests involving caustic solutions, organics, silicates and their tube sheet crevice simulator are summarized. The capsule tests with caustic showed that no environment was more aggressive than 40% NaOH + 10% KOH + 12% Cr_3O_8 at 650° for producing IGA of mill annealed alloy 600. Sulfate, carbonate and silica additions to that environment appeared to reduce the rate of IGA. The tests with mixtures of caustic and silica are described. The tests showed that within the range studied no Na/Si ratio was found to support a super heat of 80 F°. This implies that with additions of silica, crevices with a caustic environment could be dried out. C-ring (TLT) and pressure balanced capsule tests were performed in autoclaves with organic environments. These tests and test results are discussed. The organics tested included sodium acetate, phenoxide, and formate with and without additions of Cr_3O_8. No IGA or IGSCC was detected in exposure to sodium acetate. Both IGA and IGSCC were observed in exposures to sodium phenoxide and formate. Cr_3O_8 additions appeared to retard IGSCC and enhance IGA. The test results are summarized.

32780 (EPRI-NP—4929, pp C4.1-C4.17) **Fluid composition in the tube sheet crevices of a nuclear steam generator.** Weres, O.; Tsao, L. (Lawrence Berkeley Lab., CA). Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.). Contract AC03-76SF00098.

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

The fluid compositions in the tube sheet crevices of a nuclear steam generator are discussed. The chemical environment that exists in the tube sheet crevices was inferred. Four possible crevice liquids that could support a 80 F° superheat were considered: caustic, sodium acetate, potassium silicate and sodium borate. The study concludes that corrosive agents other than hydroxides, silica and organic salts must play a role in crevice corrosion. The presence of organic anions and silica in the condensate argues against a strongly alkaline crevice environment. In many cases there may be insufficient caustic in the crevice fluid to account for the corrosion observed, and other explanations must be sought.

32781 (EPRI-NP—4929, pp C5.1-C5.13) **Effects of environmental and material factors on the intergranular attack of Alloy 600.** Nagano, H.; Tokimasa, K.; Yamanaka, K.; Miyuki, H. (Sumitomo Metal Industries, Ltd., Amagasaki, Japan). Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

The effects of environmental and material factors, and stress on the intergranular corrosion (IGC) of Alloy 600 were investigated using laboratory methods (i.e., C-ring, U-bend and SSRT tests). The results obtained are as follows: IGC proceeds as intergranular attack (IGA) in the beginning and then as IGSCC dependent on the corrosiveness of the environment and the stress levels; environmental factors are more influential on the IGC of Alloy 600 than material factors. IGC occurs in an active-passive transient potential region in mixtures of concentrated NaOH plus metal oxide sludges at high temperatures; a short time sensitization heat treatment of Alloy 600 at 700°C enhances IGC resistance to some extent in the mixtures of concentrated NaOH plus metal oxide sludges; and stress is also influential on the IGC of Alloy 600 associated with the corrosiveness of environments. There may be a threshold crack depth above which IGC rapidly develops in the caustic environment.

32782 (EPRI-NP—4929, pp C6.1-C6.14) **Effect of surface films in preventing IGA attack on Alloy 600 and Alloy 690.** Lumsden, J.B. (Rockwell International Science Center, Thousand Oaks, CA). Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

The objective of this program is to identify measures that can be used to produce protective films on Alloy 600 tubes to prevent or arrest intergranular attack (IGA). The approached was to evaluate the effects of additives to caustic solutions with regard to the material's susceptibility to IGA. Surface analysis techniques were used to characterize the tube material oxide film properties. Tube materials exposed to caustic environments were analyzed from in-house samples and from samples supplied by Brookhaven (Bandy) and C.E.A. The test procedure parameters are given and the chemical composition of the tubing is identified. Results for the samples exposed to 10% sodium hydroxide plus 1% sodium carbonate are given. The primary conclusion of this work is that dealloying of the surface film causes IGA. The severity of attack is influenced as follows: IGA increases with an increase in caustic concentration, IGA increases with an increase in temperature, IGA increases as the environment becomes more reducing, the dealloyed layer is deeper in alloys 690 and 800 than in Alloy 600, and borate addition is a possible remedy by forming a thick scale.

32783 (EPRI-NP—4929, pp C8.1-C8.20) **Boric acid inhibition of Alloy 600 intergranular corrosion.** Hermer, R.E.; Wolfe, C.R. (Westinghouse Electric Corp.). Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

The environmental factors leading to intergranular attack (IGA) and intergranular stress corrosion cracking (IGSCC) are discussed. These factors include pH, stress and potential. Westinghouse used single tube model boiler tests to simulate the geometric, chemical and operating conditions found in nuclear steam genera-

tors. A schematic of the test facility is presented. Testing was conducted to reproduce the morphology and location of IGC found in the field. The simulated plant sludge used in the tests is described. A carbonate environment with an oxidizing sludge was used as a references environment. Boric acid was added to this environment to assess its effect. The conclusions of this test program were: boric acid prevented crack initiation in the references carbonate environment; the addition of boric acid after crack initiation reduced the crack propagation rate by a factor of 8 to 10; and boric acid inhibited IGA in the reference carbonate environment.

32784 (EPRI-NP—4929, pp C9.1-C9.38) **Intergranular attack of Alloy 600: evaluation of remedial actions in AJAX model boiler tests.** Daret, J. (CEA, Gif-sur-Yvette, France). Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

The results of the previous four series of AJAX tests performed by CEA are reviewed. Summaries of these tests are included. The fifth series of experimental runs involved assessment of remedial actions: crevice flushing and boric acid additions. The experimental procedure and test matrix are given. The AJAX tube sheet was slightly modified using CE-type inserts. The same heat of mill annealed Alloy 600 tubing (heat No. NX 3332 from Valourec) was used in this series. The crevices were preloaded with a mixture of sodium hydroxide, sodium sulfate and magnetite. The composition of the mixtures preloaded in the different crevices is given. The model boilers were continuously fed with AVT faulted by sodium hydroxide (0.1 ppm OH) and sodium sulfate (molar ratio of 3:1). No sludges was simulated on the top of the tube sheet. Crevice flushing was performed after exposure under normal conditions. On line boric acid addition was initiated on one boiler after crevice flushing. The results of these tests showed that: a non homogeneous composition was found along the crevice length. Dilution occurred in the upper parts while solidification probably took place in the bottom; A 508 insert material suffered a denting type corrosion in some areas leading to occlusion of some crevices and tube deformation; crevice flushing efficiency was not high, but it was improved by increasing the depressurization rate; and boric acid flushing seemed to have stopped the IGA progression.

32785 (EPRI-NP—4929, pp C10.1-C10.34) **Plant remedial actions for IGA/SCC.** Connor, W.M. (Westinghouse Electric Corp.). Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

A SURVEY OF THE VARIOUS REMEDIAL ACTIONS THAT HAVE BEEN PERFORMED OR CONSIDERED WAS MADE BY WESTINGHOUSE. A SUMMARY OF THE POSSIBLE REMEDIAL ACTIONS IS SHOWN. THE FOLLOWING TOPICS ARE DISCUSSED: IMPROVED CHEMISTRY OPERATIONS, USE OF ON LINE BORIC ACID ADDITIONS, SLUDGE LANCING, HIDEOUT RETURN STUDIES TO IDENTIFY THE SOURCES OF THE CONTAMINANTS, TUBE SHEET CREVICE FLUSHING OPERATIONS, CHEMICAL CLEANING, HOT LEG TEMPERATURE REDUCTION, AND REPAIR PROCEDURES.

32786 (EPRI-NP—4929, pp C11.1-C11.23) **Boric acid treatment on a plant with full-flow condensate polisher.** Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

The use of continuous on line additions of boric acid in plants with full-flow condensate polishers was studied. These plant steam generators are experiencing intergranular stress corrosion cracking (IGSCC) and the boric acid additions are intended to neutralize the free caustic. The environmental and material factors contributing to the cause of IGSCC are identified and possible remedial measures are given. One of those measures is the neutralization of the free caustic by boric acid treatment. Laboratory tests demonstrated that boric acid can buffer the alkalinity and reduce the corrosion rate to acceptable levels. The effects of boric acid additions on pH, boiling point elevation and vapor pressure depression are discussed. The results and conclusions of the study are summarized.

32787 (EPRI-NP—4929, pp C12.1-C12.14) **Effects of boric acid and carbonates on the initiation of intergranular corrosion in model boilers.** Brunet, J.P.; Campan, J.L. (CEA-CEN, Gif-sur-Yvette, France). Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

C.E.A.-C.E.N. Cadarache has successfully reproduced intergranular corrosion of Alloy 600 tubing in their Clarinette Model Boilers. The effects of boric acid and carbonates on the initiation of intergranular corrosion (IGC) was evaluated using the model boiler. The Clarinette test facility is described. The test sequence and matrix are discussed. To assess the effect of caustic concentration, reference tests were performed with varying concentrations of hydroxides (9 parts NaOH to one part KOH). The tests 4-9, 4-10 and 4-5 were performed with 1, 3 and 10 ppm caustic, respectively. The conclusions of this work are: IGA was successfully reproduced in the Clarinette facility, it was shown that the corrosion rate is related to the caustic concentration in the bulk water, IGA is prevented by a boric acid treatment and increases if sodium carbonate is added, and thermally treated tubes seem to be less affected than do mill annealed tubes.

32788 (EPRI-NP—4929, pp C13.1-C13.5) **B & W model boiler tests: effect of temperature on IGA rate. Initial and post-1878 operating conditions of the model boilers.** Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

The Babcock & Wilcox (B & W) model boiler operated with 10 ppm weekly injections of NaOH for 41,900 hours (4.8 years). The model boiler operating conditions are given. Tube No. 24 failed by caustic intergranular attack/stress corrosion cracking (IGA/SCC) at the steam-water zone. IGA defect depths on tube 24 is compared at different locations, which also have different temperature conditions. The specific locations are: steam/water zone, drilled baffle plate, and lower tube sheet crevice. In all locations caustic will concentrate (although to different concentration levels). Nevertheless, an effect of temperature on IGA rate can be estimated. The degree of attack relative to the location and environment is shown. SEM fractographs illustrate the completely intergranular failure of Tube 24. A summary of the estimated results is presented. These results show the estimated IGA rate as a function of primary/secondary temperature and estimated caustic concentration. Details of the failure analysis of the model boiler can be found in the final report Destructive Examination of Babcock & Wilcox's Model Boiler for Intergranular Attack (IGA) on Tubes, EPRI S302-6, J.L.; Barna and L.W. Sarver.

32789 (EPRI-NP—4929, pp C7.1-C7.13) **Preliminary summary of microcharacterization of CEA Alloy 600 IGA surfaces.** Gibbon, D.L. (Calgon Corp., Pittsburgh, PA). Dec 1986. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920219. (CONF-8510255—Summs.).

From Workshop on remedial action for secondary-side intergranular corrosion; Baltimore, MD, USA (15 Oct 1985).

Two Alloy 600 tubes from CEA tests (i.e., tubes 13-10 and 15-8) were analyzed by Calgon using microcharacterization techniques. One tube had been exposed to an environment of sodium hydroxide plus sodium sulfate (15-8) and the other was exposed to sodium hydroxide plus sodium silicate (13-10). The specimens were prepared to open the IGA corroded surfaces to aid in the analyses. The sample preparations and examinations are discussed. The specimens were analyzed by scanning electron microscopy (SEM), Auger electron microscopy (AEM), energy dispersive x-ray analysis (EDX), and light microscopy. The following results were obtained: the polished sections of the two tubes showed 100 microns

of severe IGA on tube 15-8 and 30 microns of severe IGA on tube 13-10; SEM showed plastic deformation in the base metal and complete separation of grains in IGA areas; and both tubes showed sulfur, silicon and sodium on IGA surfaces.

32790 **(EPRI-NP—5109) Production of eddy-current standards for caustic intergranular corrosion: Final report.** Miglin, B.P. (Babcock and Wilcox Co., Alliance, OH (USA). Research and Development Div.; Electric Power Research Inst., Palo Alto, CA (USA)). Apr 1987. 124p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920409.

A laboratory test was conducted to produce caustic intergranular attack (IGA) on the outside diameter (OD) surfaces of Alloy 600 and Alloy 690 nuclear steam generator sized tubing. Twelve 3-meter long tubes - eleven tubes of Alloy 600 and one of Alloy 690 - were exposed for up to 6045 hours in a solution of 50% caustic + 12% Na_2CO_3 at 343°C. Most of the tubing was in the mill-annealed condition although tubes in the thermally-treated and stress-relieved conditions were also included. Depth of IGA penetration was determined by destructive metallurgical examination on several representative cross sections per tube. Other tasks within this project were aimed at both accelerating and retarding the rate of IGA. Surface modifications such as grit blasting the OD surface with magnetite, alumina, or steel shot did not accelerate IGA. Data were obtained which showed that 15% boric acid added to 10% NaOH retarded the rate of stress corrosion cracking (SCC) of Alloy 600 at 288°C. Forty-day IGA tests of Alloy 600 in 10% NaOH at 343°C with and without 15% boric acid were inconclusive. The IGA rate of mill-annealed Alloy 600 was found to be best described by a power law with a time to the 0.60 to 0.63 power dependence. The rate of attack for thermally-treated Alloy 690 was about the same as that of thermally-treated Alloy 600, but slower than the mill-annealed condition of Alloy 600. Alloy 600 suffered volumetric IGA while the corrosion morphology of Alloy 690 was a mixture of volumetric IGA and general attack.

32791 **(EPRI-NP—5121M) Tests and analyses of crack arrest in reactor vessel materials: Final report.** Ayres, D.J.; Fabi, R.J.; Peck, D.A.; Schonenberg, R.Y. (Combustion Engineering, Inc., Windsor, CT (USA); Electric Power Research Inst., Palo Alto, CA (USA)). Apr 1987. 87p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920364.

This is the final report of EPRI Research Program RP 2180-3 performed for EPRI by Combustion Engineering, Inc. (C-E), Windsor, CT. A compact fracture test specimen was developed, and tests were performed to study crack propagation from an initial fatigue precrack in chilled reactor vessel grade steel, to arrest in warmer material of increasing toughness and rising stress intensity. The conditions necessary for crack arrest in high stress, high toughness conditions were determined by correlation of the test results to computer analyses. A simplified computer code was written which reproduces the test results. The specimens were manufactured from unirradiated nuclear reactor vessel grade steel, and the loads and toughness gradients in the tests simulated pressure and thermal loadings analogous to postulated pressurized thermal shock (PTS) conditions in irradiated vessels. Comparison of detailed dynamic elastic plastic finite element analyses and dynamic strain and displacement measurements of the crack extension, arrest and reinitiation events have led to a new understanding of the crack extension and arrest process. This understanding is shown to be applicable to the extension and arrest of cracks in pressure vessels and structures in general.

32792 **(EPRI-NP—5128) The TN-24P PWR spent-fuel storage cask: Testing and analyses: Interim report.** Creer, J.M.; Michener, T.E.; McKinnon, M.A.; Tanner, J.E.; Gilbert, E.R.; Dziadosz, D.A.; Moore, E.V.; Schoonen, D.H.; Jensen, M.F. (Pacific Northwest Lab., Richland, WA (USA); Virginia Electric and Power Co., Richmond (USA); Idaho National Engineering Lab., Idaho Falls (USA); Electric Power Research Inst., Palo Alto, CA (USA)). Apr 1987. Contract AC07-76ID01570;AC06-76RL01830. 248p. NTIS, PC A11/MF A01 - Report Research Center, Box 50490, Palo Alto, CA 94303; 1; GPO Dep. File Number DE87009214.

A performance test of a Transnuclear, Inc. TN-24P storage cask configured for pressurized water reactor (PWR) spent fuel was performed. The test was the second of a series of cask performance tests planned under a cooperative agreement between Virginia Power and the US Department of Energy. The performance test consisted of loading the TN-24P cask with 24 PWR spent fuel assemblies from Virginia Power's Surry reactor. Cask surface and fuel assembly guide tube temperatures were measured, as were cask surface gamma and neutron dose rates. Testing was performed with vacuum, nitrogen, and helium backfill environment in both vertical and horizontal cask orientations. Limited spent fuel integrity data were also obtained.

32793 **(EPRI-NP—5156) Sulfate hideout in heated crevices: Final report.** Mann, G.M.W.; Castle, R. (Electric Power Research Inst., Palo Alto, CA (USA); Central Electricity Research Labs., Leatherhead (UK)). May 1987. 34p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920428.

The hideout of Na_2SO_4 and $Na(NH_4)SO_4$ was investigated using three different heated crevices, two SO_4 concentrations (2 mg/kg and 20 μg/kg) with two available superheats (17 and 44°C) representing cold and hot-leg conditions in a PWR steam generator. The crevices used were laboratory simulations of (1) a packed annular crevice between a heated alloy 600 tube and a 405 steel support plate; (2) a clean eccentric crevice; (3) the crevice formed by hydraulic expansion of a tube into a support plate. Under all conditions, Na_2SO_4 accumulated in the crevices at a constant rate until an equilibrium was reached or approached. The hideout of $Na(NH_4)SO_4$ led to corrosion of both tube and support plate. Under hot-leg conditions, the maximum rate of hideout was 0.17 mg/ppM-hour in the packed annular crevice, and about 0.12 mg/ppM-hour in the eccentric and expanded tube crevices. Lower rates were found for cold leg conditions.

32794 (INIS-mf—10889, pp 7) **Investigations of the chemical effects of ionizing radiation in the systems of nuclear power plants.** Bartonicek, R. (Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

32795 (INIS-mf—10907, pp 516-522) **Application of failure tree method in assessing reliability of V-1 nuclear power plant.** Kubanyi, J. (Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice, Czechoslovakia). 1985. (In Slovak). NTIS (US Sales Only), PC A08/MF A01. File Number DE87780126. (CONF-8506352—Pt.2).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

The failure tree method was used for evaluating the fail-safe operation of the V-1 nuclear power plant in Jaslovske Bohunice. The following systems were evaluated: systems for the secured supply of 1st category consumers with motor generators (SYZAN-I system) and of 2nd category consumers with diesel generators (SYZAN-II system). The peak event of the failure tree for the SYZAN-I system was defined as the simultaneous loss of power for 1st category switchboards and for the SYZAN-II system as loss of power for a section. The probability evaluation of fail-safe operation was made using the ALLCUTS program. (J.P.).

32796 (INIS-mf—10907, pp 470-477) **Inspection and control system for power plants as viewed by general contractor of technological equipment.** Kouba, Z.; Griesvald, P. 1985. (In Czech). NTIS (US Sales Only), PC A08/MF A01. File Number DE87780126. (CONF-8506352—Pt.2).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

The experience is summed up with the construction of the V-2 nuclear power plant in Jaslovske Bohunice as viewed by the enterprise Vystavby elektraren Skoda Praha, the general contractor. The problems are discussed of the controversial nature of the introductory project as concerns inspection and control and the

offer of the final contractor, difficulties of coordinating the projects of the power and the engineering parts designed in Czechoslovakia and those designed in the USSR, differences in delivered machines as against the project, changes in panels of the primary and secondary parts, etc. In order to raise the efficiency of construction of other nuclear power plants it will be necessary to enforce the maximum possible volume of Czechoslovak deliveries of the inspection and control system and to ensure the timely and quality processing of documentation. It will also be necessary to enforce changes in the organization of relations between contractors and construction firms. (J.C.).

32797 (INIS-mf—10907, pp 523-535) **Nuclear power plants in electric power system.** Leicman, J.; Vokurka, F. (Ceske Energeticke Zavody, Prague, Czechoslovakia; Vyzkumny Ustav Energeticky, Bechovice, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A08/MF A01. File Number DE87780126. (CONF-8506352—Pt.2).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

The paper analyzes the demands placed by the power system on operating qualities of nuclear power plants with regard to the prospective tasks of nuclear power in the Czechoslovak power system. The characteristics of the operation of Czechoslovak nuclear plants are given taking into account the frequency and voltage deviations of the network, operating and control properties of nuclear power plants with WWER-440 and WWER-1000 reactors considering the technical conditions of operation, the required operating schedule of a nuclear power plant unit. For comparison, the demands are summed up of foreign power systems as are the control properties of foreign nuclear power units in regulating output, regulating delivered electric power and in emergency states of the system. Recommendations for further research and development are drawn from the data.

32798 (INIS-mf—10908, pp 739-748) **Development of an acoustic emission technique for materials testing of nuclear reactor pressure vessels at Skoda.** Svetlik, M. 1985. (In Czech). NTIS (US Sales Only), PC A07/MF A01. File Number DE87780127. (CONF-8506352—Pt.3).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

The acoustic emission method has been developed by SKODA enterprise for use in testing the integrity especially of reactor pressure vessels. The individual stages of development work are characterized. Currently, the development efforts are focused on the correlation of the acoustic emission signal parameters and the material fracture characteristics, and on the methodology of processing and evaluating the acoustic emission signal. It was decided that an original testing system would be developed. Its concept envisages a modular design allowing the connection of up to 16 external analog inputs between 0 and 10 V. A Z80 microprocessor will be used as the evaluation system cpu. 32 kB of memory will be availabe for programs while another 32 kB will be reserved for data recording. A characteristic feature of the improved variant of the testing system which is to be developed is the use of a 16 kB memory for each measuring channel. (Z.M.).

32799 (INIS-mf—10908, pp 731-736) **Microelectronics in quality control of nuclear power plant materials.** Smutny, S.; Herman, M. (Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice, Czechoslovakia). 1985. (In Slovak). NTIS (US Sales Only), PC A07/MF A01. File Number DE87780127. (CONF-8506352—Pt.3).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

General requirements are summed up for a control system for automated manipulators for testing materials of various components of WWER-440 nuclear power plants. They include the general purpose application of the control system for different types of manipulators, the possibility of independent manual and automatic control, the use of a microcomputer of domestic production, the use of a nonstandard keyboard allowing easy manual control and programming of the manipulator, the use of a tv camera monitor for communication with the microcomputer and for imaging the control operation sequence. The requirements for software are also given. All these requirements were implemented in a prototype of universal control unit RJM-01 based on a domestic production SM50/40-1 microcomputer. A block diagram is shown of the control system and a detailed description is presented. (Z.M.).

32800 (NUREG/CR—3956) **In situ testing of the Shippingport Atomic Power Station electrical circuits.** Dinsel, M.R.; Donaldson, M.R.; Soberano, F.T. (EG and G Idaho, Inc., Idaho Falls (USA); Nuclear Regulatory Commission, Washington, DC (USA). Div. of Engineering Technology). Apr 1987. Contract AC07-76ID01570. 45p. (EGG—2443). NTIS, PC A03/MF A01 - GPO. File Number TI87010040.

This report discusses the results of electrical in situ testing of selected circuits and components at the Shippingport Atomic Power Station in Shippingport, Pennsylvania. Testing was performed by EG & G Idaho in support of the United States Nuclear Regulatory Commission (USNRC) Nuclear Plant Aging Research (NPAR) Program. The goal was to determine the extent of aging or degradation of various circuits from the original plant, and the two major coreplant upgrades (representing three distinct age groups), as well as to evaluate previously developed surveillance technology. The electrical testing was performed using the Electrical Circuit Characterization and Diagnostic (ECCAD) system developed by EG & G for the US Department of Energy to use at TMI-2. Testing included measurements of voltage, effective series capacitance, effective series inductance, impedance, effective series resistance, dc resistance, insulation resistance and time domain reflectometry (TDR) parameters. The circuits evaluated included pressurizer heaters, control rod position indicator cables, miscellaneous primary system Resistance Temperature Detectors (RTDs), nuclear instrumentation cables, and safety injection system motor operated valves. It is to be noted that the operability of these circuits was tested after several years had elapsed because plant operations had concluded at Shippingport. There was no need following plant shutdown to retain the circuits in working condition, so no effort was expended for that purpose. The in situ measurements and analysis of the data confirmed the effectiveness of the ECCAD system for detecting degradation of circuit connections and splices because of high resistance paths, with most of the problems caused by corrosion. Results indicate a correlation between the chronological age of circuits and circuit degradation.

32801 (WCAP—11334-Vol.1) **Farley Unit 1 EOC-2 through 5 17 X 17 OFA on-site examinations report: Volume 1, Principal results and evaluation.** Shah, H.; Kunishi, H. (Westinghouse Electric Corp., Pittsburgh, PA (USA). Nuclear Energy Systems Div.). Nov 1986. Contract FC01-85NE34131. 103p. NTIS (US Sales Only), PC A06/MF A01. File Number DE87008897.

This report describes the postirradiation examinations and performance evaluations carried out after each of the first four irradiation cycles on Farley Unit 1 fuel. The fuel consisted of two 17 x 17 Optimized Fuel Assemblies (OFAs) placed in the J.M. Farley Unit 1 reactor for reactor cycles 2 through 5, along with standard 17 x 17 fuel assemblies. The irradiation started in November 1979 and four irradiation cycles were completed by March 1984 with an average burnup of ~39 GWD/MTU. The on-site nondestructive examinations performed included visual inspection, profilometry, grid force measurements, length measurements (fuel rod, grid and the assembly), waterside corrosion measurements by an eddy current technique and rod bow measurement by video inspection and SULO probe methods. A summary of the design features of the demonstration 17 x 17 Optimized Fuel Assembly and irradiation history of the assemblies are included. On the basis of the results of all four end-of-cycle postirradiation examinations performed on the 17 x 17 Optimized Fuel Assemblies, it is concluded that the fuel rods and assembly performed satisfactorily up to a burnup level of ~39 GWD/MTU.

32802 (WCAP—11334-Vol.2) **Farley Unit 1 EOC-2 through 5 17 X 17 OFA on-site examinations report: Volume 2, Data appendices.** Shah, H.; Kunishi, H. (Westinghouse Electric Corp., Pittsburgh, PA (USA). Nuclear Energy Systems Div.). Nov 1986. Contract FC01-85NE34131. 87p. NTIS (US Sales Only), PC A05/MF A01; 1; GPO Dep. File Number DE87008898.

Volume two of this report provides appendices A through G in listing data obtained from postirradiation examinations and performance evaluations carried out after each of the first four irradiation cycles on Farley Unit 1 fuel. This data compilation contains: reactor operating data; cladding diameter data; breakaway/withdrawal force and grid relaxation data; corrosion data, length measurement data, grid lateral width data, and fuel rod channel spacing data. Volume 1 of this report provides the principal results and evaluation of the postirradiation examinations. (FI)

2103 Power Reactors, Non-breeding, Graphite Moderated

REFER ALSO TO CITATION(S) 32824, 32825, 32949, 32956, 32957, 32965, 33178

2104 Power Reactors, Non-breeding, Otherwise Moderated Or Unmoderated

REFER ALSO TO CITATION(S) 32948

2105 Power Reactors, Breeding

REFER ALSO TO CITATION(S) 32872, 32887, 32946, 32989, 33009, 33157, 33163

32803 **(CEA-CONF—8738) Experience of Super-Phenix fuel fabrication.** Bariteau, J.P.; Grignon, F. (CEA Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-les-Durance (France). Inst. de Recherche Technologique et de Developpement Industriel (IRDI)). Dec 1986. 12p. (In French). (CONF-861262—9). NTIS (US Sales Only), PC A02/MF A01. File Number DE87751816.

From SFEN conference on fast reactors and the startup of superphenix; Paris, France (10 Dec 1986).

After a brief presentation of the fabrication unit of Cadarache, this paper presents the fabrication process and the fabrication itself of the Super-Phenix fuel (pellets, pins, assemblies).

32804 **(CEA-CONF—8763) On the dynamic buckling of thin shells.** Combescure, A.; Hoffmann, A.; Homan, R. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Dept. d'Etudes Mecaniques et Thermiques). Oct 1986. 10p. (CONF-8610264—1). NTIS (US Sales Only), PC A02/MF A01. File Number DE87751813.

From 2. international seminar on standards and structural analysis is elevated temperature applications for reactor technology; Venice, Italy (15 Oct 1986).

The shells of a pool type reactor like Super Phenix 1 or the Super Phenix 2 project are relatively thin compared to the diameter. Normal loads and mainly seismic loads due to strong fluid-structure interaction and giving pressure of the same order then static collapse pressure. This is a main difficulty for a good and safe design of LMFBR. The paper describes the experimental results obtained at CEA-DEMT on the seismic buckling of structures filled with fluid. A general tendency is given on all experimental results. The experimental results are analysed by two simple models and the main results are explained. A strategy to design a structure against dynamic buckling is then presented. 7 refs.

32805 **(CONF-870405—6) JASPER: A joint US-Japan program of experimental shielding research.** Ingersoll, D.T.; Ohtani, N. (Oak Ridge National Lab., TN (USA); Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)). 1987. Contract AC05-84OR21400. 9p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87005693.

From Radiation protection and shielding conference; Knoxville, TN, USA (22 Apr 1987).

A cooperative shielding research program between the US Department of Energy and Japan's Power Reactor and Nuclear Fuel Development Corporation has been initiated. The program includes six specific shielding integral experiments to be performed at the Oak Ridge National Laboratory Tower Shielding Facility and analyzed by both US and Japanese participants. Planned experiments include studies of (1) attenuation in radial shield mockups, (2) neutron streaming in a fission gas plenum, (3) shield effectiveness of different axial shield designs, (4) neutron streaming in narrow gaps, (5) source multiplication effects within in-vessel stored fuel assemblies, and (6) sodium activation in an intermediate heat exchanger mockup. The first experiment, which included numerous configurations containing steel, graphite, and boron carbide, has been completed and initial results are presented. The remaining four experiments, which are in various stages of planning, fabrication and execution, are described briefly.

32806 **(HEDL-SA—3477-FP) LMR cladding and duct materials development.** Powell, R.W.; Johnson, G.D.; Hamilton, M.L.; Garner, F.A. (Hanford Engineering Development Lab., Richland, WA (USA)). May 1986. Contract AC06-76FF02170. 14p. (CONF-860931—20). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009508.

From International conference on reliable fuels for liquid metal reactors; Tucson, AZ, USA (7 Sep 1986).

The alloys used for cladding and ducts for Liquid Metal Reactors (LMR) have undergone a dramatic change in the past few years. All LMR core components were originally fabricated from austenitic stainless steels primarily because of high temperature strength and good corrosion resistance. Operation of the various LMRs brought forth several problems with these steels, the most notable being dimensional instability produced by internal void formation. Efforts to mitigate this problem centered on compositional modifications and different thermomechanical treatments. Recently, a number of LMR programs have placed a major emphasis on ferritic/martensitic stainless steels. Studies have shown that these steels with the body centered cubic structure are more resistant to swelling than those of the face centered cubic lattice. Steels in the 9 to 12% chromium range are now being used in the tempered condition. High exposures have been obtained without measurable swelling. Future core materials research is directed towards improving the high temperature strength of this class of materials. The most promising approach is that of using a fine dispersion of an inert oxide.

32807 **(IEN-DITRA—09/85) Determination of the necessary parameters for a protection insulation disk of sodium circuit weighing system for thermomechanical and small component tests.** Bloch, M.; Cesar, S.B.G. (Instituto de Engenharia Nuclear, Rio de Janeiro (Brazil)). 27 Dec 1985. 17p. (In Portuguese). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702286.

The parameters requisited for a plastic disk used as thermal insulation, between feeding tank and weighing system, where the tank is supported are defined. The tank and weghing system are component parts of sodium circuit for thermomechanical and small component tests. During the circuit operation the temperature at tank reaches 600°C, however the temperature at weghing system should not reach 50°C. The temperature distribution in insulation disk is obtained by finit element method in function of thickness and thermal conductivity of material. The results obtained indicate for thickness E = 32 mm should be K <0.05 W/m°C and for E = 48 mm the thermal conductivity should be K < 0.15W/m°C. In both cases the pressure is $\sigma > 14.5$ Kgf/mm². (M.C.K.).

32808 **(IWGFR—61) Specialists' meeting on fast reactor cover gas purification: Summary report.** (International Atomic Energy Agency, Vienna (Austria). International Working Group on Fast Reactors). 1987. 288p. (CONF-8609227—). NTIS (US Sales Only), PC A13/MF A01. File Number DE87900693.

From IAEA specialists meeting on fast reactor cover gas purification; Richland, WA, USA (24 Sep 1986).

Separate abstracts were prepared for the individual papers in this report. (JDB)

32809 **(ORNL/TM—10302) VELM61 and VELM22: Multigroup cross-section libraries for sodium-cooled reactor shield analysis.** Fu, C.Y.; Ingersoll, D.T. (Oak Ridge National Lab., TN (USA)). Apr 1987. Contract AC05-84OR21400. 48p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87008567.

Two coupled neutron and photon multigroup cross-section libraries, derived from ENDF/B-V nuclear data, are described. The energy group structures, 61n/23γ and 22n/10γ, are subsets of the Vitamin-E 174n/38γ group structure, and are tailored to the iron and sodium resonances, windows, and capture gamma-ray spectra. Each of the two libraries are available in two formats, the AMPX master format and the ANISN format. Cross sections for all materials in the Vitamin-E library were collapsed using a standard energy weighting function, and in addition, several cross-section sets for each of the major constituents of commercial grade sodium, stainless steel (types 304 and 316), and carbon steel were derived using several problem-dependent weighting functions for averaging the fine groups. Effects of various group structures and weighting functions on the accuracy of the broad group libraries are studied by ANISN analysis of a typical sodium-iron shield configuration.

32810 **PRD components of an EBR-II configuration.** Meneghetti, D.; Kucera, D.A. (Argonne National Lab., IL). *Transactions of the American Nuclear Society;* **52**: 654-656(1986). (CONF-860610—).

From American Nuclear Society annual meeting; Reno, NV, USA (15 Jun 1986).

The linear components of the power reactivity decrement (PRD) for a heterogeneous loading (run 93A) of Experimental Breeder Reactor II (EBR-II) have been calculated using the EBR-POCO program together with an addition to the program, RODCO, which accounts for effects of axial positionings of control rods. The program calculates detailed axially delineated contributions of the components of the PRD for every subassembly of the reactor configuration. The sum of these contributions is subtracted from the corresponding measured PRD value to give the nonlinear (subassembly-bowing) component.

32811 **EBR-II time constant calculation using the EROS kinetics code.** Grimm, K.N.; Meneghetti, D. (Argonne National Lab., IL). *Transactions of the American Nuclear Society;* **52**: 656-657(1986). (CONF-860610—).

From American Nuclear Society annual meeting; Reno, NV, USA (15 Jun 1986).

System time constants are important parameters in determining the dynamic behavior of reactors. One method of determining basic time constants is to apply a step change in power level and determine the resulting temperature change. This methodology can be done using any computer code that calculates temperature versus time given either a power input or a reactivity input. In the current analysis this is done using the reactor kinetics code EROS. As an example of this methodology, the time constant is calculated for an Experimental Breeder Reactor II (EBR-II) fuel pin.

2106 Power Reactors, Auxiliary, Mobile, Package, And Transportable

REFER ALSO TO CITATION(S) 32650, 32998

2107 Regulation And Licensing

REFER ALSO TO CITATION(S) 32745, 32970, 32971, 32972, 32973, 32977, 33032

32812 **(INIS-mf—10609) Annual report 34-37 on the activities of the Institute for International Law of the University of Goettingen, January 1, 1982 to December 31, 1985.** (Goettingen Univ. (Germany, F.R.). Inst. fuer Voelkerrecht). 1986. 77p. (In German). NTIS (US Sales Only), PC A05/MF A01. File Number DE87751896.

The report reviews the scientific activities of the institute from 1982 to 1985. The Department for Atomic Energy Law continued with research and documentation dealing with all legal questions concerning the peaceful use of nuclear energy and the protection against ionising radiation, including international law agreements and the safeguards system. The subjects of all seminars held are listed, the theses and other publications, and also other scientific activities outside the institute. (HSCH).

32813 **(NUREG—0090-Vol.9-No.3) Report to Congress on abnormal occurrences, July-September 1986.** (Nuclear Regulatory Commission, Washington, DC (USA). Office for Analysis and Evaluation of Operational Data). Apr 1987. 56p. NTIS, PC A04/MF A01 - GPO. File Number TI87900690.

Section 208 of the Energy Reorganization Act of 1974 identifies an abnormal occurrence as an unscheduled incident or event which the Nuclear Regulatory Commission determines to be significant from the standpoint of public health or safety and requires a quarterly report of such events to be made to Congress. This report covers the period from July 1 to September 30, 1986. The report states that for this reporting period, there were four abnormal occurrences at the nuclear power plants licensed to operate. The events were (1) a differential pressure switch problem in safety systems at LaSalle facility, (2) abnormal cooldown and depressurization transient at Catawba Unit 2, (3) significant safeguards deficiencies at Wolf Creek and Fort St. Vrain, and (4) significant deficiencies in access controls at River Bend Station. There was one abnormal occurrence at the other NRC licensees; it involved a therapeutic medical misadministration. There was one abnormal occurrence reported by an Agreement State; it involved a therapeutic medical misadministration. The report also contains information updating some previously reported abnormal occurrences.

32814 **(NUREG—0750-Vol.24-No.5) Nuclear Regulatory Commission issuances.** (Nuclear Regulatory Commission, Washington, DC (USA). Div. of Publications Services). Nov 1986. 96p. NTIS, PC A05/MF A01 - GPO. File Number TI87900689.

This report includes the issuances received during the specified period from the Commission (CLI), the Atomic Safety and Licensing Appeal Boards (ALAB), the Atomic Safety and Licensing Boards (LBP), the Administrative Law Judge (ALJ), the Directors' Decisions (DD), and the Denials of Petitions for Rulemaking (DPRM).

32815 **(NUREG/CR—2000-Vol.6-No.3) Licensee Event Report (LER): Compilation for month of March 1987.** (Oak Ridge National Lab., TN (USA); Nuclear Regulatory Commission, Washington, DC (USA). Office for Analysis and Evaluation of Operational Data). Apr 1987. Contract AC05-84OR21400. 104p. (ORNL/NSIC—200-Vol.6-No.3). NTIS, PC A06/MF A01 - GPO. File Number TI87009307.

This monthly report contains Licensee Event Report (LER) operational information that was processed into the LER data file of the Nuclear Safety Information Center (NSIC) during the one month period identified on the cover of the document. The LERs, from which this information is derived, are submitted to the Nuclear Regulatory Commission (NRC) by nuclear power plant licensees in accordance with federal regulations. Procedures for LER reporting for revisions to those events occurring prior to 1984 are described in NRC Regulatory Guide 1.16 and NUREG-1061, Instructions for Preparation of Data Entry Sheets for Licensee Event Reports. For those events occurring on and after January 1, 1984, LERs are being submitted in accordance with the revised rule contained in Title 10 Part 50.73 of the Code of Federal Regulations (10 CFR 50.73 - Licensee Event Report System) which was published in the Federal Register (Vol. 48, No. 144) on July 26, 1983. NUREG-1022, Licensee Event Report System - Description of Systems and Guidelines for Reporting, provides supporting guidance and information on the revised LER rule. The LER summaries in this report are arranged alphabetically by facility name and then chronologically by event date for each facility. Component, system, keyword, and component vendor indexes follow the summaries. Vendors are those identified by the utility when the LER form is initiated; the keywords for the component, system, and general keyword indexes are assigned by the computer using correlation tables from the Sequence Coding and Search System.

2108 Economics

REFER ALSO TO CITATION(S) 32742, 32747, 32797, 32826, 32916, 32924

32816 (CONF-870406—, pp II.5.1-II.5.25) **Training benefits from NSSS owners group participation.** Hine, R.C.; Jones, J.E.; Ruzich, K.C. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

Even though the event at Three Mile Island was a bleak moment in the history of nuclear power, many advances in the nuclear industry have evolved as a result. One such advancement involves the establishment of NSSS Vendor Owners Groups. These groups were organized on a voluntary basis with nearly all utilities participating. The main purpose was to achieve mutual benefit, both technical and financial, through joint engineering and plant operation programs. This paper focuses on the Westinghouse Owners Group, which is commonly referred to as the WOG, and how it has benefited and could further benefit utility training. The paper consists of three sections. The first section provides an overview of the WOG structure and how it functions. The second section focuses on the major accomplishments of the WOG with emphasis on the development of the Emergency Response Guidelines (ERGs). The third section provides some recommendations as to how utility training departments can better utilize their owners groups.

32817 (CONF-870406—, pp II.6.1) **NRC influences on nuclear training.** Hannon, J.N. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

NRC influences on utility training programs through prescriptive requirements and evaluation of industry self-initiatives are discussed. NRC regulation and industry initiatives are complimentary and in some instances industry initiatives are replacing NRC requirements. Controls and feedback mechanisms designed to enhance positive NRC influences and minimize or eliminate negative influences are discussed. Industry and NRC efforts to reach an acceptable mix between regulator oversight and self-initiatives by the industry are recognized. Problem areas for continued cooperation to enhance training and minimize conflicting signals to industry are discussed. These areas include: requalification examination scope and content, depth of training and examination on emergency procedures; improved learning objectives as the basis for training and examination, and severe accident training.

32818 (DOE/NE/34133—1) **Process Inherent Ultimate Safety (PIUS) reactor evaluation study: Final report.** (United Engineers and Constructors, Inc., Philadelphia, PA (USA)). Feb 1987. Contract AI01-85NE34133. 247p. (TVA/OP/EDT—87/18). NTIS, PC A11. File Number DE87008560.

This report presents the results of an independent study by United Engineers and Constructors (UNITED) of the SECURE-P Process Inherent Ultimate Safety (PIUS) Reactor Concept which is presently under development by the Swedish light water reactor vendor ASEA-ATOM of Vasteras, Sweden. This study was performed to investigate whether there is any realistic basis for believing that the PIUS reactor could be a viable competitor in the US energy market in the future. Assessments were limited to the technical, economic and licensing aspects of PIUS. Socio-political issues, while certainly important in answering this question, are so broad and elusive that it was considered that addressing them with the limited perspective of one small group from one company would be of questionable value and likely be misleading. Socio-political issues aside, the key issue is economics. For this reason, the specific objectives of this study were to determine if the estimated PIUS plant cost will be competitive in the US market and to identify and evaluate the technical and licensing risks that might make PIUS uneconomical or otherwise unacceptable.

32819 (EPRI-NP—4843-M) **Nuclear plant piping criteria and construction costs: Final report.** Landers, D.F. (Teledyne Engineering Services, Waltham, MA (USA); Electric Power Research Inst., Palo Alto, CA (USA)). Nov 1986. 193p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920175.

The objectives of this study were to: (1) answer on a limited basis, why cost increases associated with the construction of nuclear power piping and supports have occurred, (2) provide a mechanism for utilities to track and assess the cost impact of Code and Regulatory additions and revisions related to piping criteria. The cost study was performed by reviewing nuclear piping installation costs for three units at a single site with a commercial operation date range of 16 years between Units 1 and 3. A number of conclusions are reached, the most important of which are: craft labor hours for piping installation today can, and have been controlled to a degree that is competitive with plants constructed in the late 1960's; and the overall piping and support cost increase factor per megawatt (corrected for inflation) from Unit 1 to Unit 3 is 1.76. Changes to Code and Regulations related to piping have been assembled for a 15 year period. This information is computerized and can be sorted using a number of variables. Some cost increase or decrease data is provided. A utility can use this information to determine the cost impact associated with changes in criteria in the following areas: dealing with Public Utility Commissions or other government agencies; and replacements to operating facilities covered by Section XI of the ASME Code.

32820 (INIS-mf—10902, pp 16) **Energy systems analysis.** Heindler, M.; Hinterkircher, M.; Lesch, K.H.; Molin, A.; Mally, K. Dec 1986. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702298.

In Annual report (October 1985 - September 1986).

32821 (INIS-mf—10903) **International energy workshop: overview of poll responses.** Manne, A.S.; Schrattenholzer, L.; Minkoff, T.F. (International Inst. for Applied Systems Analysis, Laxenburg (Austria)). Jan 1987. 401p. NTIS (US Sales Only), PC A18/MF A01. File Number DE87702299.

The International Energy Workshop is an informally organized group. Its general aim is to compare the most up-to-date long-term energy projections available throughout the world, and to obtain a better understanding of the reasons for their differences. The current edition of the IEW poll supersedes all previous ones, and contains only those poll responses bearing publication dates of 1984-1986. Altogether, this edition of the poll contains 192 individual responses received from 71 participating organizations. The poll covers the period 1980-2010. Appendix I contains frequency distributions for each of the eight standard IEW regions: (1) USSR and Eastern Europe, (2) China, (3) Centrally Planned Economies, Subtotal, (4) OECD, (5) OPEC, (6) Non-OPEC Developing Countries, (7) Market Economies, Subtotal, and (8) World, Total. In addition, frequency distributions are provided for four individual countries/regions: Canada, Japan, OECD Europe, and USA. Poll items 3-16 refer to individual fuel types: oil, gas, coal, hydroelectric, nuclear, solar and other renewables. To ensure international comparability, these are expressed in terms of commercial primary energy consumption, production and net trade (exports minus imports).

32822 (INIS-mf—10907, pp 428-434) **Future of power industry and automation.** Komarek, A. 1985. (In Czech). NTIS (US Sales Only), PC A08/MF A01. File Number DE87780126. (CONF-8506352—Pt.2).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

The position of automation whose role it is to replace man with an automated machine in order to raise productivity is evaluated with regard to its effective employment in the power industry. The development of the power industry and the respective level of automation is increasingly influenced not only by growing energy consumption but also by its cost, the decline of reserves of conventional raw materials and the rising importance of nuclear power. The basic trends and possible uses of automation in the power industry are summed up with regard to the development of cybernetics, microelectronics, hardware and software. The most interesting

developments are summed up in hardware and software applied in the development of the automation of large power generating units. The question is discussed of the use of the latest achievements in automation in teh Czechoslovak power industry and the problems are summed up of the development of automation technology for nuclear power. (J.C.).

22 NUCLEAR REACTOR TECHNOLOGY

REFER ALSO TO CITATION(S) 32740

2201 Theory And Calculation

REFER ALSO TO CITATION(S) 32886, 33000, 34181, 34223

32823 **(CEA-CONF—8761) Multilevel transport calculations.** Sanchez, R.; Mondot, J. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Dept. d'Etudes Mecaniques et Thermiques). Oct 1986. 12p. (CONF-861035—3). NTIS (US Sales Only), PC A02/MF A01. File Number DE87751814.

From 2. international meeting on simulation methods in nuclear engineering; Montreal, Canada (14 Oct 1986).

A new model for multigroup transport calculations based on a group-dependent spatial representation has been developed. The multilevel method takes advantage of the orthogonality of the energy and space operators, inherent to the structure of the linear transport equation, to decompose the energy domain into subdomains or levels, i.e., fast, epithermal and thermal, where suitable spatial approximations are used. The aim of the method is to allow for the use of larger mesh spacings at high neutron energies and, therefore, to cut down the computational cost while preserving the overall accuracy. The method can be easily implemented in today's standard transport codes by introducing small modifications in the computation of the multigroup external source. The multilevel model is of special interest for the calculation of media containing high thermal absorbers. A variant of this method, based on a nested, multilevel approximation, has been implemented in the APOLLO-II assembly transport code. Comparisons between the multilevel model and the usual multigroup approximation have been made for a PWR poisoned cell and for a thermal neutron barrier used to feed a molten FBR fuel sample. The results show that significant savings in computational times are obtained with the multilevel approximation. 10 refs.

32824 **(INIS-mf—10644) Compilation of reactor physics data of the year 1984, AVR reactor.** Werner, H.; Bergerfurth, A.; Thomas, F.; Geskes, B. (Arbeitsgemeinschaft Versuchs-Reaktor G.m.b.H., Duesseldorf (Germany, F.R.)). Dec 1985. 75p. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE87751892.

The 'AVR reactor physics data' is a documentation published once a year, the data presented being obtained by a simulation of reactor operation using the AVR-80 numerical model. This model is constantly updated and improved in response to new results and developments in the field of reactor theory and thermohydraulics, and in response to theoretical or practical modifications of reactor operation or in the computer system. The large variety of measured data available in the AVR reactor simulation system also makes it an ideal testing system for verification of the computing programs presented in the compilation. A survey of the history of operations in 1984 and a short explanation of the computerized simulation methods are followed by tables and graphs that serve as a source of topical data for readers interested in the physics of high-temperature pebble-bed reactors.

32825 **(INIS-mf—10645) Compilation of reactor physics data of the year 1983, AVR reactor.** Werner, H.; Bergerfurth, A.; Thomas, F.; Geskes, B. (Arbeitsgemeinschaft Versuchs-Reaktor G.m.b.H., Duesseldorf (Germany, F.R.)). Jun 1985. 75p. (In German). NTIS (US Sales Only), PC A04/MF A01. File Number DE87751893.

The 'AVR reactor physics data' is a documentation published once a year, the data presented being obtained by a simulation of reactor operation using the AVR-80 numerical model. This model is constantly updated and improved in response to new results and developments in the field of reactor theory and thermohydraulics, and in response to theoretical or practical modifications of reactor operation or in the computer system. The large variety of measured data available in the AVR reactor simulation system also makes it an ideal testing system for verification of the computing programs presented in the compilation. A survey of the history of operations in 1983 and a short explanation of the computerized simulation methods are followed by tables and graphs that serve as a source of topical data for readers interested in the physics of high-temperature pebble-bed reactors.

32826 **(INIS-mf—10902) Annual report (October 1985 - September 1986).** Heindler, M. (ed.). (Technische Univ., Graz (Austria). Inst. fuer Theoretische Physik und Reaktorphysik). Dec 1986. 28p. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702298.

There are 18 contributions, ranging in size from a few lines to about a page, on work done in the institute; 15 thereof of INIS interest. There is additionally a list of lectures and practical works. (G.Q.).

32827 **(LA-UR—87-48) Few-group representation of the energy spectra of delayed neutrons.** Brady, M.C.; England, T.R. (Los Alamos National Lab., NM (USA)). 1987. Contract W-7405-ENG-36. 7p. (CONF-870601—8). NTIS, PC A02/MF A01; GPO Dep. File Number DE87005119.

From Annual meeting of the American Nuclear Society; Dallas, TX, USA (7 Jun 1987).

The importance of delayed neutrons in reactor calculations has been well established. A recent evaluation of delayed neutron data has resulted in the compilation of a reference library containing emission probabilities, Pn's, and energy spectra for ~272 individual precursor nuclides. The library may be used to calculate aggregate spectra and total delayed neutron yields. 10 refs., 1 fig., 1 tab.

32828 **Neutron capture processes in fission reactors.** Poenitz, W.P. (Argonne National Lab., Argonne, IL). pp 154-175 of Neutron radiative capture. Allen, B.J.; Bergovist, I.; Chrien, R.E.; Gardner, D.G.; Poenitz, W.P. Elmsford, NY; Pergamon Books Inc. (1984).

The neutron radiative capture process plays an important role in many aspects of nuclear power reactors and the associated fuel cycles. Presently operating thermal reactors burn fissile nuclei (/sup 235/U, /sup 239/Pu, and /sup 233/U) with the main objective of electrical power generation. However, the major thrust of the current reactor research programs is oriented toward fast breeder reactors which will not only produce electrical power but also convert, by neutron capture, abundant /sup 238/U to fissile fuel /sup 239/Pu (or /sup 232/Th to /sup 233/U) which can be used in turn for further breeding or as fuel for thermal reactors in order to replace less abundant /sup 235/U. The power production and the maintenance of the fission chain reaction in a reactor is based on the fission process, e.g. for /sup 235/U.

2202 Components And Accessories

REFER ALSO TO CITATION(S) 32819, 32892, 32955, 32994, 33146, 33148, 33198

32829 **(CONF-870598—1-Abst.) Motor current signature analysis for determining operational readiness of motor-operated valves (MOVs).** Kryter, R.C.; Haynes, H.D. (Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 19p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009830.

From 4. conference on utility experience in reactor noise analysis; Hartford, CT, USA (12 May 1987).

Motor current signature analysis (MCSA) is a novel diagnostic process for condition monitoring of electric-motor-driven mechanical equipment (e.g., pumps, motor-operated valves, compressors, and processing machinery). The MCSA process identifies, characterizes, and trends over time the instantaneous load variations of mechanical equipment in order to diagnose changes in the

condition of the equipment (e.g., due to degradation or service wear), which, if allowed to continue, may lead to failure. It monitors the instantaneous variations (noise content) in the electric current flowing through the power leads to the electric motor that drives the equipment. The motor itself thereby acts as a transducer, sensing both large and small, long-term and rapid, mechanical load variations and converting them to variations in the induced current generated in the motor windings. This motor current noise signature is detected, amplified, and further processed as needed to examine its time domain and frequency domain (spectral) characteristics. The operational principles of MCSA and the nonintrusive data collection apparatus and procedure used with MOVs will be described. Data collected from MOVs in both laboratory and in-plant environments will also be shown to illustrate the ability of MCSA to "see" the detailed inner workings of the valve and operator and thus to detect degraded performance at an incipient stage. (Set of 18 vugraphs)

32830 **(EGG-M—16486) Laboratory piping system vibration tests to determine parametric effects on damping in the seismic frequency range.** Ware, A.G. (EG and G Idaho, Inc., Idaho Falls (USA)). 1987. Contract AC07-76ID01570. 7p. (CONF-870636—7). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009394.

From 5. national congress on pressure vessels and piping; San Diego, CA, USA (28 Jun 1987).

A pipe damping research program is being conducted for the United States Nuclear Regulatory Commission at the Idaho National Engineering Laboratory to establish more realistic, best-estimate damping values for use in dynamic structural analyses of piping systems. As part of this program, tests were conducted on a 5-in. (128 mm ID) laboratory piping system to determine the effects of pressure, support configuration, insulation and response amplitude on damping. The tests were designed to produce a wide range of damping values, from very low damping in lightly excited uninsulated systems with few supports, to higher damping under conditions of either/or insulation, high level excitation, and various support arrangements. The effect of pressure at representative seismic levels was considered to be minimal. The supports influence damping at all excitation levels; damping was highest when a mechanical snubber was present in the system. The addition of insulation produced a large increase in damping for the hydraulic shaker excitation tests, but there was no comparable increase for the snapback excitation tests. Once a response amplitude of approximately one-half yield stress was reached, overall damping increased to relatively high levels (>10% of critical).

32831 **(EGG-M—31586) Piping system damping data at higher frequencies.** Ware, A.G. (EG and G Idaho, Inc., Idaho Falls (USA)). 1987. Contract AC07-76ID01570. 11p. (CONF-870636—9). NTIS, PC A02. File Number DE87009397.

From 5. national congress on pressure vessels and piping; San Diego, CA, USA (28 Jun 1987).

Research has been performed at the Idaho National Engineering Laboratory (INEL) for the United States Nuclear Regulatory Commission (USNRC) to determine best-estimate damping values for dynamic analyses of nuclear piping systems excited in the 20 to 100 Hz frequency range. Vibrations in this frequency range are typical of fluid-induced transients, for which no formal pipe damping guidelines exist. The available data found in the open literature and the USNRC/INEL nuclear piping damping data bank were reviewed, and a series of tests on a straight 3-in. (76-mm) piping system and a 5-in. (127-mm) system with several bends and elbows were conducted as part of this research program. These two systems were supported with typical nuclear piping supports that could be changed from test to test during the series. The resulting damping values were ≧ those of the Pressure Vessel Research Committee (PVRC) proposal for unisulated piping. Extending the PVRC damping curve from 20 to 100 Hz at 3% of critical damping would give a satisfactory representation of the test data. This position has been endorsed by the PVRC Technical Committee on Piping Systems. 14 refs.

32832 **(EPRI-NP—5130) Comparative evaluation of acoustic holography systems: Topical report.** MacDonald, D.E.; Kietzman, E.K. (EPRI Nondestructive Evaluation Center, Charlotte, NC (USA); Electric Power Research Inst., Palo Alto, CA (USA)). Apr 1987. 56p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920415.

The Sigma Research, Inc. SDL-1000 Acoustic Holography Imaging System developed under RP 606 was evaluated by the EPRI NDE Center. A preliminary evaluation completed in early 1986 included measuring the system performance for unclad surface inspections of the Program for the Inspection of Steel Components-II (PISC-II) Plate No. 2 and the Combustion Engineering (CE) plate and comparing it with the results of multifrequency holography system. Based on the preliminary investigation, a cooperative project between EPRI and the Babcock & Wilcox (B & W) Owners' Group was initiated to provide direction for possible future development efforts in acoustical holography. The project included the evaluation of the Sigma Research's SDL-1000 and the B & W's acoustical holography system. The project tasks were: an evaluation of the B & W Relative Partial Sums (RPS) procedure for setting the plotting threshold for reconstructed holographic images; re-analysis of the available 2 MHz data using the RPS procedure; collection of 5 MHz holographic data on the flaws in the CE slab; analysis of the 5 MHz data using the RPS procedure; and destructive sectioning of flaws in the CE plate to validate the RPS procedure for setting the image threshold and to compare acoustical holography system performance.

32833 **(FEI—1698) Empirical formulae for velocity fields and coefficients of momentum and heat turbulent transfer in linear channels of intricate shape.** Buleev, N.I.; Zinina, G.A.; Kazakova, L.Ya.; Mironovich, R.Ya.; Timukhina, M.M. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.). 1985. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702259.

Empirical formulas for velocity fields and coefficients of turbulent heat transfer in steady flows of liquid in rectilinear channels of complex configuration are presented. The data permit to simplify equation solution algorithm of heat transfer in channels with complex boundaries. The effect of interchannel mixing is taken into account in addition to turbulent heat transfer. Formulas for the velocity fields and turbulent heat transfer coefficients were tested using calculations for velocity fields and temperature of liquid steady turbulent flows in a round tube and liquid flow in annular gaps. Suggested formulas for turbulent heat transfer coefficients are widely used for numerical studies of temperature fields in non-standard cells of reactor fuel assembly. A good agreement between calculated and experimental data is obtained. 7 references, 4 figures, 1 table.

32834 **(FEI—1705) Method solving hydrodynamics equations using velocity variables.** Leonchuk, M.P.; Sivak, Z.V.; Shvetsov, Yu.E. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.). 1985. 15p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702260.

Effective numerical method for solving Navier-Stokes equations and those for porous body model in velosity variables is suggested. Nonexplicit difference analogue of the solvable system of equations is obtained by its integration on the net with separated velocity and pressure components and using approximation down the fow for convective members. To solve it numerical trial run method is used that is characterized by exact solution of continuity equation at each calculation step. The suggested method is absolutely stable, has a high conergence rate as compared to the methods in velocity-pressure variables and may be used for calculating turbulent flows and flows in the regions with heterogeneous properties. The above method is realized as DUPT program unit for BESM-6 and ES-1060 computers aimed to calculate liquid flow in multi-coupled regions with varied properties, for example, in nuclear reactor coolant circuits. 4 references, 3 figures.

32835 **(FhG-IzfP—860139-TW) Application of HOLOSAFT for nondestructive testing of reactor components. Final report.** Schmitz, V.; Mueller, W.; Schaefer, G.; Graeber, B.; Hoppstaedter, K. (Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., Saarbruecken (Germany, F.R.). Inst. fuer Zerstoerungsfreie Pruefverfahren; Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1 Nov 1985. 171p. (In German). NTIS (US Sales Only), PC A08/MF A01. File Number DE87751924.

The aim of the project was to develop a superimposed ultrasonic test process, or to combine existing ones, so that a classification and three dimensional representation of defects is made possible. Two analytic test processes - ultrasonic holography and SAFT (synthetic aperture focussing technique) are combined, using identical hardware components and developing common software packages to create an imaging process called HOLOSAFT. The high possible lateral resolution of ultrasonic holography parallel to the test sample surface is used, together with the high possible axial resolution of the SAFT process at right angles to the surface, in order to make measurement of defects possible in three coordinate directions. The development of the process is described in detail, where, based on physical-mathematical bases, the equipment and software developed for pulse echo and tandem arrangements are discussed. The possible resolution is examined in laboratory experiments as a function of the test head diameter, the picture is examined as a function of the aperture length and the picture quality is examined as a function of the ultrasonic devices and defect orientation. Other chapters are concerned with measuring the defect depth, the determination of inclined positions, multi-angle sounding and examination of components with curved surfaces. The results show the great capacity for analysis of the HOLOSAFT process and its suitability for application in nuclear power stations.

32836 (INIS-mf—10907, pp 561-566) **Reliability of electrical part of nuclear power plants.** Marko, S. (Slovenska Vysoka Skola Technicka, Bratislava, Czechoslovakia). 1985. (In Slovak). NTIS (US Sales Only), PC A08/MF A01. File Number DE87780126. (CONF-8506352—Pt.2).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

The electric equipment of nuclear power plants may be divided into several groups: heavy current equipment (alternators, transformers), reactor control and protection system components, coolant circulation circuit components, cable routes, distribution equipment and stand-by power supplies. The undesirable consequences are summed up of the accident shut-down of nuclear power plant units owing to breakdowns in electrical equipment. Reliability models were used for the quantitative reliability analysis of electrical equipment. Because it was impossible to define elements of electrical equipment using the constant intensity of breakdowns or repairs, methods were used based on replacing the actual empirical distribution function by degrees of state aligned in series or in parallel (non-Markov reliability models). (J.C.).

32837 **(MRE-SM—07/86) Welding and brazing applied in nuclear engineering.** Payao, J. (Ministerio das Relacoes Exteriores, Brasilia (Brazil). Sistema de Informacao Cientifica et Tecnologica do Exterior (SICTEX)). 1986. 32p. (In Portuguese). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702389.

The welding and brazing techniques used in the fabrication of materials for building nuclear power plants such as tubes and pressure vessels are presented. (M.C.K.).

32838 **(NUREG/CR—4841) Fracture evaluation of surface cracks embedded in reactor vessel cladding: Unirradiated bend specimen results.** McCabe, D.E. (Materials Engineering Associates, Inc., Lanham, MD (USA); Nuclear Regulatory Commission, Washington, DC (USA). Div. of Engineering). May 1987. 67p. (MEA—2200). NTIS, PC A04/MF A01 - GPO. File Number TI87900674.

The surface crack embedded in the clad layer of a reactor vessel has been identified as a critical fracture safety assessment condition relative to the pressurized thermal shock accident scenario. This project was initiated to determine the severity of such cracks experimentally, using irradiated material, and to identify the material property and stress conditions in the local region of the crack that are significant to the analysis. Bend bar tests provide the experimental simulation of the subject RPV surface crack. This report describes the initial investigation using unirradiated material, addresses the analysis techniques, and presents the findings indicated by the experimental results.

32839 **(NUREG/CR—4872) Experimental and analytical assessment of circumferentially surface-cracked pipes under bending.** Scott, P.M.; Ahmad, J. (Battelle Columbus Div., OH (USA); Nuclear Regulatory Commission, Washington, DC (USA). Div. of Engineering Safety). Apr 1987. 164p. (BMI—2149). NTIS, PC A08/MF A01 - GPO. File Number TI87900678.

This study was performed to assess the validity of various techniques to predict maximum loads for circumferentially surface-cracked pipes under bending. Experimental data were developed for both carbon steel and stainless steel pipes. Predictions of maximum loads were made using the net-section-collapse method, the IWB-3640 analysis procedures, and a newly developed finite-length surface-cracked pipe J-estimation method. The net-section-collapse method gave good maximum-load predictions for certain types of pipe. However, for pipes with large radius to thickness (R/sub m//t) ratios and/or low toughness this analysis method tended to overpredict the experimental maximum load. A plastic-zone screening criterion was developed to show when this method was valid and when elastic-plastic fracture mechanics should be used. The limit-load procedures embodied in IWB-3640 provide the desired underprediction of the failure stress. The average failure stress for the nine stainless steel base metal experiments was 61% higher than predicted by Table IWB-3641-1 and 23% higher than predicted by the Source Equations. For the three stainless steel flux weld experiments the predicted failure stresses were adjusted by a stress multiplier to account for the lower toughness of the flux welds. The average failure stress for the flux weld experiments was 78% higher than predicted by Table IWB-3641-5 and 39% higher than predicted by the Source Equations. Predictions from two versions of the new finite-length surface-cracked pipe J-estimation method were compared to experimental results. One version is for pipes with large R/sub m//t ratios (SC.TNP) while the other is a more general approach (SC.TKP) where the large R/sub m//t ratio restriction is relaxed. The results show that the SC.TNP method tends to overestimate the maximum loads by 15% on the average whereas the SC.TKP method tends to underpredict the maximum loads, as desired, by 32%.

32840 **Solid tags for identifying failed reactor components.** Bunch, W.L.; Schenter, R.E. (to Dept. of Energy, Washington, DC). US Patent 4,657,729. 14 Apr 1987. Filed date 19 Jun 1984. vp.

This patent describes a solid tag material for identifying a nuclear reactor component when placed within the component comprising: solid materials which contain at least one non-gaseous element that undergoes nuclear transmutation into one or more detectable, identifiable, and measurable tag gases on irradiation in a nuclear reactor. The tag gases generated are stable, are not fission products, and are generated in predetermined proportions different from their natural occurrence. Upon the failure of a component the tag gases can be detected in the reactor cover gas and the failed component identified according to the tag gas composition.

32841 **Application of models for IGSCC inspection.** Gray, T.A.; Thompson, R.B.; Newberry, B.P.; Achenbach, J.D.; Budreck, D. (Ames Lab., IA). pp 93-100 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—).

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

Ultrasonic detection and sizing of intergranular stress corrosion cracks (IGSCC) in nuclear reactor cooling systems is a difficult practical problem due to the complicated geometry of these defects and to the variety of other reflectors (e.g., welds) which produce competing ultrasonic indications. The use of models of scattering from such defects can help in improving physical insight into ultrasonic scattering from IGSCC's and may ultimately be of

use in defining inspection protocols and signal processing algorithms which can lead to improved inspection reliability and discrimination between IGSCC's and other geometrical reflectors. This paper will discuss the application of a model of ultrasonic scattering from a simple Y-shaped crack based upon the Kirchhoff approximation. In this model, the ultrasonic beam is approximated by a Gaussian profile which includes the effects of diffraction and allows calculations of the full ultrasonic radiation pattern which may be used, for example, to simulate a scanned inspection. Included in this paper will be a brief description of the model and a presentation of simulated IGSCC results. Comparisons of the model to experimental measurements will then be addressed followed by an application to the problem of IGSCC sizing based upon the dB-drop and PAT (pulse-arrival-time) techniques.

32842 **Application of pattern recognition techniques to acoustic emission from steel and aluminum.** Friesel, M.A. (Battelle, Pacific Northwest Lab., Richland, WA). pp 337-343 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—).

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

Much of the interest in using acoustic emission to monitor structural components is a result of the ability of the technique to detect growing cracks. The greatest problem standing in the way of applying this technique is the presence of signals from innocuous sources, which can make identification of crack-produced emission difficult, especially in those circumstances when cracks must be detected in real time and without other reliable correlation parameters. The test results presented here suggest an approach to eliminate spurious signals from acoustic emission data which may be applicable to real time analysis and amenable to a variety of monitoring methods. The approach consists of the characterization of the sensor response to the signal from a single crack-growth microsource and the consequent elimination of most macrosource signals by characterizing crack growth stochastically to account for random variations in the data. The materials tested include a reactor pressure vessel steel and a simulated welded joint using aluminium.

32843 **SIIA: a knowledge-based assistant for the SAFT ultrasonic inspection system(a).** Melton, R.B.; Doctor, S.R.; Taylor, T.T.; Badalamente, R.V. (Pacific Northwest Lab., Richland, WA). pp 889-897 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—). Contract AC06-76RL01830.

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

SIIA(b) is a knowledge-based system designed to assist in making the operation of the Synthetic Aperture Focussing Technique (SAFT) Ultrasonic Inspection System more reliable and efficient. This paper reports on their effort to develop a prototype version of SIIA to demonstrate the feasibility of using knowledge-based systems in nondestructive evaluation (NDE). The first section of the paper describes the structure of the problem and their conceptual design of the knowledge-based system. The next section describes the current state of the prototype SIIA system and relates some of their experiences in developing the system. The final section discusses their plans for future development of SIIA and the implications of this type of system for other NDE techniques and applications.

2203 Fuel Elements

REFER ALSO TO CITATION(S) 32876, 32882, 33006, 33165

32844 (JINR—D-13-85-793, pp 467-470) **Electronic CAMAC device for measuring gamma activity of the WWER type fuel elements.** Gregorova, Eh.; Rumler, Ts. (Ceskoslovenska Akademie Ved, Rez. Ustav Jaderne Fyziky). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

A device for measuring secondary gamma radiation in accurately restricted parts of WWER fuel elements is described. The data obtained are used for estimation of neutron flux distribution in axial and radial distributions and for optimization of the regime of fuel element operation.

32845 **A mixed core conversion study with HEU and LEU fuels.** Matos, J.E.; Freese, K.E. (Argonne National Lab., Argonne, IL). pp 765-776 of Applications in nuclear data and reactor physics. Cullen, D.E.; Muranaka, R.; Schmidt, J. Philadelphia, PA; World Scientific Pub. Co. (1986). (CONF-860202—).

From Workshop on applications in nuclear data and reactor physics; Miramare, Trieste, Italy (17 Feb 1986).

The results of a mixed core study are presented for gradual replacement of HEU fuel with LEU fuel using the IAEA generic 10 MW reactor as an example. The key parameters show that the transition can be accomplished safely and economically.

32846 **Apparatus for inspecting fuel elements.** Kaiser, B.J.; Oakley, D.J.; Groves, O.J. (to Dept. of Energy). US Patent Application 6-685,081. 21 Dec 1984. 35p. Contract AC06-76FF02170. DE87007261 NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87007261.

This disclosure describes an alpha monitor usable in an automated nuclear fuel pin loading and processing unit. Fuel pins or other elongated pins are fed laterally into the alpha monitor in a singular fashion and are translated by a first roller assembly into a weld flare machining and decontamination substation not forming a part of the invention. Pins return and are lifted upwardly and transferred across to a combined pin lifting and electrode operating means which lifts the pins upwardly into a clamshell electrode assembly which is spread open by a combined pin lifting and electrode operating means. Once inserted the clamshell type electrode arrangement closes around the fuel pins so that inspection can occur. Fuel pins are inspected by charging electrodes to a negative potential and measuring the change in charge occurring when positively charged alpha particles strike the negatively charged electrodes. After inspection, the fuel pins are lowered by the pin lifting and electrode operating means into a second roller assembly which longitudinally conveys approved pins from the airtight enclosure in which the alpha monitor is mounted. If the fuel pins are rejected then they are moved laterally by a second transfer means and onto another system for further processing.

2204 Control Systems

REFER ALSO TO CITATION(S) 32836, 32946, 33001

32847 (DGLR—85-04) **Evaluation of man-machine systems - methods and problems.** (Deutsche Gesellschaft fuer Luft- und Raumfahrt e.V., Bonn (Germany, F.R.)). 1985. 277p. (In German). (CONF-8511279—). NTIS (US Sales Only), PC A13/MF A01. File Number DE87751901.

From DGLR symposium: evaluation of man-machine systems - methods and problems; Koeln, F.R. Germany (14 Nov 1985).

The symposium gives a survey of the methods of evaluation which permit as quantitive an assessment as possible of the collaboration between men and machines. This complex of problems is of great current significance in many areas of application. The systems to be evaluated are aircraft, land vehicles and watercraft as well as process control systems.

32848 (DGLR—85-04, pp 127-136) **Overview on applied methods in the FRG to investigate human factors in control rooms of nuclear power plants.** Thomas, D.B. (Technischer Ueberwachungs-Verein Rheinland e.V., Koeln, Germany, F.R. Inst. fuer Unfallforschung). 1985. (In German). NTIS (US Sales Only), PC A13/MF A01. File Number DE87751901. (CONF-8511279—).

From DGLR symposium: evaluation of man-machine systems - methods and problems; Koeln, F.R. Germany (14 Nov 1985).

In the first half of 1984 a feasibility study was carried out with respect to the CSNI of the OECD/NEA inventory of methods for the analysis and evaluation of human factors in the control room of nuclear power plants. In order to enable an analysis of the methods to be made, an elementary categorization of the methods under field studies, laboratory studies and theoretical studies was performed. A further differentiation of these categories was used as the basis for a critical analysis and interpretation of the methods employed in the research plan. In the following sections, an explanation is given of the method categories used and the plans included in the investigation. A short representation is given of the breakdown of the applied methods into categories and an analysis is made of the results. Implications for research programs are discussed.

32849 (DGLR—85-04, pp 137-154) **Incident simulation at the power plant simulator - on the interpretation of operator actions and their cognitive causes as basis for ergonomic recommendations.** Becker, G. (Technischer Ueberwachungs-Verein Rheinland e.V., Koeln, Germany, F.R. Inst. fuer Unfallforschung). 1985. (In German). NTIS (US Sales Only), PC A13/MF A01. File Number DE87751901. (CONF-8511279—).

From DGLR symposium: evaluation of man-machine systems - methods and problems; Koeln, F.R. Germany (14 Nov 1985).

We first carried out a pilot investigation, the aims of which were twofold, the development of suitable methods and the provision of evidence that these methods bring us nearer to the aims of the plan as a whole; the deduction of initial ideas for ergonomic improvements, since this BMFT program is application-oriented and is not a basic program. To the best of our knowledge, our investigation is the only one in which experienced nuclear power plant operators (operations staff) were observed during their handling of an unknown failure situation on a full simulator. During this investigation, the currently most promising methods for the analysis of strategies for the organization and solution of problems were applied, which comprise the interaction (particularly verbal) between the operators of a team with simultaneous video recording.

32850 (DGLR—85-04, pp 155-164) **Ergonomic requirements to control room design - evaluation method.** Hinz, W. 1985. (In German). NTIS (US Sales Only), PC A13/MF A01. File Number DE87751901. (CONF-8511279—).

From DGLR symposium: evaluation of man-machine systems - methods and problems; Koeln, F.R. Germany (14 Nov 1985).

The method of evaluation introduced is the result of work carried out by the sub-committee 'Control Room Design' of the Engineering Standards Committee in DIN Standards, Ergonomv. This committee compiles standards for the design of control rooms (instrumentation and control) for the monitoring and operation of process engineering cycles. With the agreement of the committee - whom we wish to take the opportunity of thanking at this point for their constructive collaboration - a planned partial standard will be introduced thematically in the following, in order that knowledge gained from the discussion can be included in further work on the subject. The matter in question is a procedure for the qualitative evaluation of the duties to be performed under the control of operators in order that an assessment can be made of existing control concepts or such concepts as are to be found in the draft phase.

32851 (DGLR—85-04, pp 165-186) **Procedure for optimal design of a man-machine interface.** Behrendt, V.; Hartfiel, H.D.; Mannhaupt, H.R.; Preuss, W.; Thomas, D.B. (Dornier System G.m.b.H., Friedrichshafen, Germany, F.R.; Kraftwerk Union A.G., Erlangen, Germany, F.R.; Technischer Ueberwachungs-Verein Bayern e.V., Muenchen, Germany, F.R.; Technischer Ueberwachungs-Verein Rheinland e.V., Koeln, Germany, F.R.). 1985. (In German). NTIS (US Sales Only), PC A13/MF A01. File Number DE87751901. (CONF-8511279—).

From DGLR symposium: evaluation of man-machine systems - methods and problems; Koeln, F.R. Germany (14 Nov 1985).

Both man and machine have special characteristics and capabilities which should be given optimum exploitation. In order that the special human characteristics and capabilities can be used accordingly, i.e., human reliability in process control given full optimization, duties and working conditions and equipment must be adapted and designed to meet human requirements. In order that this requirement can be met, it is essential for consideration to be given to work-related ergonomic knowledge in the development and planning of control rooms and control instruments. One possibility of achieving this aim is by using work analysis methods to achieve a clear-cut and detailed description of the operator's duties and the contiguous assessment of ergonomic recommendations specific to duties which should be given consideration in the design of a place of work.

32852 (INIS-mf—10907, pp 303-307) **Control and protection system of Czechoslovak WWER-440 reactors.** Hrstka, V.; Drab, F.; Franc, L. 1985. (In Czech). NTIS (US Sales Only), PC A08/MF A01. File Number DE87780126. (CONF-8506352—Pt.2).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

As of the V-2 nuclear power plant with a WWER-440 reactor, Czechoslovak nuclear power plants are provided with a new system of reactor control and protection. A brief technical description is given of the system, its internal configuration and external relations. Also presented is the main inspection and adjustment work carried out within the physical and power start-up of the first unit of the Czechoslovak V-2 nuclear power plant.

32853 (INIS-mf—10907, pp 321-328) **Testing and calibration of neutron detection routes prior to physical start-up of WWER-440 unit.** Hustava, S.; Drab, F.; Vostry, L.; Svoboda, C. (Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia). 1985. (In Slovak). NTIS (US Sales Only), PC A08/MF A01. File Number DE87780126. (CONF-8506352—Pt.2).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

Three types of detection routes are used for control and protection of the WWER-440 reactor (type 213), namely the neutron detector + amplifier/converter. Owing to the varied degree of sensitivity they allow to cover the whole range of the reactor neutron output of N=(10^{-10} to 100)% N(rated). The basic demands and problems are summed up which had to be tackled in the inspection and calibration of the routes, both prior to assembly and during repeated checks of the assembled detection routes preceding the physical start-up of the first unit of the V-2 nuclear power plant. Recommendations are put forward for further research and development whose objective is to upgrade the methodology of checks of start-up operations of other units and to increase nuclear safety.

32854 (INIS-mf—10907, pp 508-515) **Ergonomic aspects in designing unit operator's console.** Krulis, J. (Vyzkumny Ustav Bezpecnosti Prace, Prague, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A08/MF A01. File Number DE87780126. (CONF-8506352—Pt.2).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

The question is discussed of raising operating reliability, efficiency and safety of nuclear power plants by the gradual replacement of man in the process of control by automatic control systems. An analysis of the failure of complex technological systems has shown that the human factor is the cause of 70 to 90% of all accidents. The areas are listed of the most frequent use of computer systems in nuclear power (automation of testing and control, upgrading communication between operator and technological equipment, evaluation and signalling of warnings and failures, and rationalization of protocol writing). The main problems of the use of computer based control and information systems include the integration of computer-based and classical instrumentation, the distribution of functions between operator and computer, the methods of data pre-processing, the use of graphics, optimized data coding, etc. (J.C.).

32855 (INIS-mf—10907, pp 536-547) **Testing of reactor regulator ARM-5S in power start-up.** Lnenicka, B.; Wagner, K.; Prochazka, F.; Pliska, J. (Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A08/MF A01. File Number DE87780126. (CONF-8506352—Pt.2).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

Modernized reactor power regulator ARM-5S is described, one of the main components of the reactor control and protection system; the regulator was tested during the power start-up of the reactor unit. The ARM-5S regulator consists of three independent regulating units: regulators of power output, of steam pressure in main steam collector and of turbine. The regulator design allows three modes of operation: regulation of reactor power output to a constant value, regulation of output according to a technological parameter, and regulation preventing the increase in steam pressure over a preset level. Regulator trials were aimed at testing the performance and the parameters of regulated quantities in the three modes. Quantitative and qualitative agreement was reached between experimental values and model calculations of the main transient processes. (J.C.).

32856 (INIS-mf—10907, pp 403-413) **Simulation of dynamics of WWER-1000 nuclear power plant for analysis of unit power control system.** Karpeta, C.; Roubal, S. (Vyzkumny Ustav Energeticky, Bechovice, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A08/MF A01. File Number DE87780126. (CONF-8506352—Pt.2).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

A mathematical model is constructed of the dynamic properties of the main technological equipment of a nuclear power plant with WWER-1000 reactors for the purpose of an analysis of the unit's power control system. The basic characteristics are given of the heterogeneous WWER type reactor (rated thermal output 3000 MW, 312 fuel elements, coolant and moderator - water enriched with H_3BO_3, etc.). The automatic control system of the unit allows power control and start-up and shut-down in case of accident. The system of power control contains regulating systems for reactor power, output of turbines, primary circuit pressure, water level in the pressurizer and the steam generator. In the current version the model covers the reactor, the primary circuit, the pressurizer, the secondary side of the steam generator, the turbine and regeneration of feedwater. The model is implemented on an ODRA 1305 computer using the FORSIM-5M simulation system. The model was used for calculating the response of unit 1 of the Temelin nuclear power plant to step changes in reactivity, primary coolant flow and to opening of the control valve. (J.C.).

32857 (INIS-mf—10908, pp 624-629) **Special automation elements for nuclear power industry.** Prochazka, O. (Zavody Prumyslove Automatizace, Brno, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A07/MF A01. File Number DE87780127. (CONF-8506352—Pt.3).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

A series of special automation devices were developed for use with higher level control systems at the Temelin nuclear power plant. Briefly described is the function of these devices, their basic specifications and demands placed on them with regard to the nuclear power plant operation. They include diode elements which are designed for signal protection in the current loop in case of a failure or disconnection of any instrument series-connected in the loop. Unification elements serve the connection of resistance thermometers according to the Soviet standard GOST and the assembly of redundant supply is designed for automatic switching over to a 220 V redundant battery in case of an outage of the main distributor. The end elements allow remote manual or automatic control of regulating servomotors in connection with the DASOR computer based control system. Also described is a unit designed for galvanic separation of control and information signals between the unit control room or emergency control room and the end elements. (Z.M.).

32858 (INIS-mf—10908, pp 647-656) **Role of human factor in diagnostic system of nuclear power plant.** Prokop, K. (Jaderna Elektrarna, Dukovany, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A07/MF A01. File Number DE87780127. (CONF-8506352—Pt.3).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

The role of the human factor in nuclear power plant control is discussed and its key significance pointed out. The role of the diagnostic system in such control is described. The system must be independent on the system of control and inspection. The role of the human factor in the diagnostic system is also discussed. Even here it has key significance. A detailed analysis is made of demands placed on personnel of departments of in-service diagnostics and their technical training is outlined. Recommendations are made which are aimed at securing that the human factor should not become the weak element in the diagnostic system. (Z.M.).

32859 (INIS-mf—10908, pp 765-776) **HINDUKUS - system of in-core control.** Spinler, S.; Franc, L.; Staralova, D. 1985. (In Czech). NTIS (US Sales Only), PC A07/MF A01. File Number DE87780127. (CONF-8506352—Pt.3).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

The HINDUKUS in-core testing system designed for WWER-440 reactors is described in detail. The system provides the production, collection and processing of information on the reactor core and also collects information from other sensors installed on the steam generator, the main circulating pump, the pressurizer, etc. Information on the core is provided using temperature and neutron flux sonsors. The information is collected and processed using electronic apparatus consisting of an analog part (input multiplexers, analog-to-digital converters), a digital part (memories, processor), and an output part (display monitor). The apparatus comprises 6 blocks of ROM and 2 blocks of RAM. All programs which are part of the HINDUKUS system software are briefly characterized. The system is on-line connected to an SM-2 computer. (Z.M.).

32860 (INIS-mf—10908, pp 833-846) **Diagnostics of a steam generating nuclear facility with regard to HINDUKUS special control system.** Wohlmut, J.; Franc, L.; Soganic, J. 1985. (In Czech). NTIS (US Sales Only), PC A07/MF A01. File Number DE87780127. (CONF-8506352—Pt.3).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

The possible diagnostic applications are discussed of the HINDUKUS in-core testing system installed in WWER-440 reactors. Attention is focused on the accuracy and reliability of measurements performed with the HINDUKUS system. The system offers information of a continuous nature while automatic signal processing for diagnostic purposes requires discrete values. The conclusion is arrived at that the use of system HINDUKUS for reactor core diagnostics is necessary because it would be superfluous to install any instruments in addition to the existing instrumentation. The situation will be facilitated by the fact that the HINDUKUS system will be provided with an improved SM-2 computer whose software comprises modules suitable for both the diagnostics of the HINDUKUS system itself and the diagnostics of the reactor core. (Z.M.).

32861 (INIS-mf—10908, pp 579-581) **Diagnostics of components of primary and secondary circuits of WWER-440 nuclear power plants.** Mikus, T. (Atomova Elektraren Bohunice, Jaslovske Bohunice, Czechoslovakia). 1985. (In Slovak). NTIS (US Sales Only), PC A07/MF A01. File Number DE87780127. (CONF-8506352—Pt.3).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

A brief description is presented of the monitoring diagnostic system installed in both units of the V-1 nuclear power plant in Jaslovske Bohunice. The system manufactured by Brueel and Kjaer, Denmark, operates on the principle of evaluating vibroacoustic signals from selected components of the primary and secondary circuits. Both reactors of the V-2 nuclear power plant in Jaslovske Bohunice are equipped with similar systems manufactured by West German company KWU and home manufacturers. (Z.M.).

32862 (INIS-mf—10908, pp 595-601) **Computer identification of changes in vibroacoustic signals.** Oksa, G.; Jaros, I. (Vyskumny Ustav Jadrovych Elektrarni, Jaslovske Bohunice, Czechoslovakia). 1985. (In Slovak). NTIS (US Sales Only), PC A07/MF A01. File Number DE87780127. (CONF-8506352—Pt.3).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

The application is discussed of some parametric statistical tests in analyzing data obtained by frequency analysis of vibroacoustic signals of acceleration in the main circulating pumps in both units of the V-1 nuclear power plant at Jaslovske Bohunice. The procedure is shown of discretizing analog signals and of their subsequent processing using the programmable IN 110 signal analyzer, up to obtaining a defined data set from the measurement. This then forms a basis for further statistical processing. The statistical tests applied can be classified into pair tests (F test, T test) and methods allowing the analysis of any finite number of sets (dispersion analysis with simple classification, the so-called Adamenkov test). Preliminary experience justifies a claim that the said procedures show high sensitivity.

32863 (INIS-mf—10908, pp 630-638) **Computer analysis of vibroacoustic diagnostic signals.** Prokop, K. (Jaderna Elektrarna, Dukovany, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A07/MF A01. File Number DE87780127. (CONF-8506352—Pt.3).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

The system of in-service diagnostics for the first unit of the Dukovany nuclear power plant is described. It consists of a system for monitoring vibrations, a system for detecting loose parts and foreign bodies, a two-channel spectral analyzer and the ADT 4410 central computer. The basic part of the system for monitoring vibrations processes low-frequency signals in the range 0.5 to 150 Hz from absolute shift sensors placed on the reactor vessel and from induction sensors placed on the steam generator body. The system for detecting loose parts and foreign bodies processes signals in the frequency range 1 to 10 kHz from piezoelectric sensors of acceleration placed on the pressure vessel, steam generators, main circulating pumps and on regulating assembly drives. Also given are the basic characteristics of vibroacoustic signals representing a random process. Special attention is devoted to the digitization of analog signals. (Z.M.).

32864 (INIS-mf—10908, pp 639-646) **Diagnostic measurements during start-up of unit 1 of Dukovany nuclear power plant.** Prokop, K. (Jaderna Elektrarna, Dukovany, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A07/MF A01. File Number DE87780127. (CONF-8506352—Pt.3).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

Basic information is summed up on diagnostic measurements performed during the first, second and third hydraulic tests carried out during the start-up of the first unit of the Dukovany nuclear power plant. Measurements were made on the reactor, the main circulating pipes, the main closing valve, the steam generator, the main circulating pump, the pressurizer and selected valves of the primary circuit. The tests were made using the vibroacoustic method, the method of acoustic emission, the measurement of coolant leaks and valve leaks. A preliminary analysis of the results of diagnostic measurements showed that with regard to dynamics the primary circuit represents a complex mechanical system with internal feedback between the mechanical and hydraulic phenomena. Together with an evaluation of the measured transient characteristics the results will help to correctly adjust the diagnostic system at the first unit of the Dukovany nuclear power plant. (Z.M.).

32865 (INIS-mf—10908, pp 681-692) **Nonlinear controller of Kaskad system and its modelling.** Rubek, J.; Boucek, S. (Vyzkumny Ustav Energeticky, Bechovice, Czechoslovakia; Ceske Vysoke Uceni Technicke, Prague, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A07/MF A01. File Number DE87780127. (CONF-8506352—Pt.3).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

The R 21 controller of the KASKAD unified Soviet control system is described which is widely used in Czechoslovak nuclear power plants with WWER-440 reactors. This is a nonlinear pulse controller operating approximately according to the PI control law. The method is presented of the calculation of parameters of the controller model corresponding to actual adjustable values on the control panel of the controller, and the model is compared with measurements made using the actual controller. Also presented are some other results of measurements made using this controller such as characterize its properties with regard to operating needs, mainly the reproducibility of the controller operation, its stability and the effects of the ambient temperature. (Z.M.).

32866 (INIS-mf—10908, pp 693-699) **EXSUG I - imitator of nuclear reactor dynamic behavior.** Sarnak, J. (Atomova Elektraren Bohunice, Jaslovske Bohunice, Czechoslovakia). 1985. (In Slovak). NTIS (US Sales Only), PC A07/MF A01. File Number DE87780127. (CONF-8506352—Pt.3).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

The AKNT-Sugan instrument system is designed for checking neutron flux in Unit 1 of the Jaslovske Bohunice V-2 nuclear power plant. A number of problems arose during its commissioning, especially problems concerning adjustment and also testing the correct adjustment of the BIK instruments designed for evaluating pulse signals from ionization chambers. Improved pulse generator EXSUG I was developed for correcting the shortcomings. The generator is capable of generating exponentially increasing or decreasing pulse rates within the range of 0.0487 and 100,000 s^{-1}. The generator makes it possible to correctly adjust the BIK instruments, this also at a low pulse rate and a short preset period. (Z.M.).

32867 (INIS-mf—10908, pp 708-718) **In-service diagnostic systems of nuclear power plants -current project design situation in Czechoslovakia.** Sklenicka, C. (Energoprojekt, Prague, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A07/MF A01. File Number DE87780127. (CONF-8506352—Pt.3).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

The current state of project designs of automated systems of in-service diagnostics of Czechoslovak nuclear power plants in operation and under construction is described. For the V-1 nuclear power plant in Jaslovske Bohunice the project did not incorporate any such system and partial applications are only now being considered by the operator. As for the V-2 nuclear power plant at Jaslovske Bohunice and the Dukovany nuclear power plant the projects only incorporate conceptual pre-requisites for in-service inspections of the pressure vessel from the outside and revisions of some components of the primary circuit. The measurement and evaluation of vibroacoustic parameters of the main components of the primary circuit was only designed additionally. The diagnostic systems of the two power plants differ in the number of components covered and the number of measuring points. As for the Mochovce and Temelin nuclear power plants the automated systems of in-service diagnostics were already incorporated in the project design. The problems of such work are briefly outlined. (Z.M.).

32868 (INIS-mf—10908, pp 789-799) **Effect of live steam extraction for heating purposes on power control system of V-1 and V-2 nuclear power plants.** Stirsky, P.; Markvart, J.; Bednarik, K. (Vyzkumny Ustav Energeticky, Bechovice, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A07/MF A01. File Number DE87780127. (CONF-8506352—Pt.3).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

The effect was studied of operating and failure-mode changes in steam extraction for district heating from the main steam collectors of the V-1 and V-2 nuclear power plant units. The changes first show up by steam pressure changes, which affects the power control systems of the power plants. The control programs of the plants are based on constant steam pressure in the main steam collectors. The study was performed using a mathematical model of the dynamics of a WWER-440 nuclear power plant. The operation of all important control circuits was considered in the dynamics calculations. The adjustment of controller parameters in the model corresponded to the actual adjustment of the control systems for the V-1 and V-2 nuclear power plant units. It is shown that from the economic point of view, the changes in steam extraction for heating purposes should be offset by changes in the turbine output without changing the reactor output. With the current control programs and the properties of the controllers installed in the

V-1 and the V-2 nuclear power plants, this requirement can only be satisfied with certain limitations. (Z.M.).

32869 (INIS-mf—10908, pp 823-832) **Cooperation of nuclear reactor controller ARM-5S and turbine TVER-02.** Wagner, K.; Lnenicka, B.; Pokorny, F.; Prochazka, F. 1985. (In Czech). NTIS (US Sales Only), PC A07/MF A01. File Number DE87780127. (CONF-8506352—Pt.3).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

Turbines of Czechoslovak make provided with controllers TVER-02 are installed in WWER-440 nuclear power plants under construction in Czechoslovakia. Reactor output is controlled using Soviet-made controllers ARM-5S which already comprise turbine controllers. The problems are analyzed of cooperation of both controllers, especially their parameters and transient processes in typical operating situations. The analysis uses the results of measurements performed during the power start-up of Unit 1 of the V-2 nuclear power plant at Jaslovske Bohunice. The results show that two types of control modes can be selected for the operation of the entire unit: the control to constant unit output, and control of unit output varying with turbine load selected on the TVER-02 controller or given by the demand of the power network. (Z.M.).

32870 (JINR—D-13-85-793, pp 349-352) **Software for information and measurement system of the IBR-30 pulse research reactor.** Savvateev, A.S. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

Software for the IBR-30 reactor on-line measurement system developed on the base of a set of CAMAC moduli and the MERA 60-30 microcomputer and intended for recording parameters characterizing reliability and safety of the reactor under operation of emergency shutdown system is described. Software is developed by the modulus principle and is realized within the frames of the RT-11 operating system. Some moduli are united in a job-oriented library for solution of specific problems. Software is used during several years and provides data recording at the rate of 115 and 210 values per second for reactor operation modes at the pulse repetition frequency equal to 5 and 100 Hz respectively.

32871 (JINR—D-13-85-793, pp 462-466) **Use of a microprocessor for automated control of neutron beam chopper at the IBR-22 reactor.** Kryuchkov, V.N.; Le Kkhak Man'; Rodionov, K.G.; Solov'ev, B.N.; Tishin, V.G. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

A microprocessor system for on-line operation of an electron beam chopper at the IBR-2 reactor is developed. The chopper represents a steel disk 1205 mm in diameter. The mass of the disk equals 750 kg. The disk is joined by means of a shaft coupling with an asynchronous engine shaft. The considered system should ensure accuracy of coincidence not worse than +-0.5 degree or +-0.14% of the reactor power pulse repetition rate. Preliminary check out of the system operation with the EhKT2 D-63/380 type improved frequency converter and the 12-digit digit-to-analog converter displayed essential decrease of the dynamic error.

32872 (KFK—4178) **Inherently safe SNR shutdown system with Curie point controlled sensor/switch unit.** Mueller, K.; Norajitra, P.; Reiser, H. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Material- und Festkoerperforschung; Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Schneller Brueter). Feb 1987. 26p. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE87751928.

Inherent shutdown due to increase in the sodium temperature at the core outlet is triggered by interruption of the current supply to the electromagnet coupling of absorber elements via curie point controlled sensor/switch units. These switches are arranged above suitable fuel element positions and spatially independent of the shutdown elements. Compared with other similar systems very short response times are achieved. A prototype switch unit has already undergone extensive testing. These tests have confirmed that switching takes place in a very narrow temperature range.

32873 (RFP—4110) **Computerization upgrade project for the Rocky Flats Plant Critical Mass Laboratory Reactor Control Console.** Bachman, H.C.; Miles, R.E.; Sachs, R.D. (Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant). 1987. Contract AC04-76DP03533. 47p. NTIS MF A01; 2; GPO Dep. File Number DE87008695.

This report discusses present and planned future work on computerization of the Rocky Flats Plant (RFP) Critical Mass Laboratory (CML) Nuclear Reactor Control Console. No computerized control functions are planned or anticipated at this time. The scope of this computerization effort is limited to Data Acquisition and Analysis. In this work an IBM-PC will be connected to four (4) Nuclear Safety channels, and two (2) nonnuclear safety channels. Programming is being done in interpretive advanced BASIC. At the present time only two channels, Linear Picoammeters 1 and 2, are having their signals processed by the IBM-PC.

2205 Environmental Aspects

REFER ALSO TO CITATION(S) 32965, 32966, 33022, 33675

32874 (EGG-M—31086) **Development and calibration of an aerosol monitor used for PBF [Power Burst Facility] Test SFD [severe fuel damage] 1-4.** Adams, J.P.; Partin, J.K.; Petti, D.A.; Reed, T.R. (EG and G Idaho, Inc., Idaho Falls (USA)). 1986. Contract AC07-76ID01570. 18p. (CONF-861204—8). NTIS, PC A02/MF A01. File Number DE87009402.

From 4. Miami international symposium on multi-phase transport and particulate phenomena; Miami Beach, FL, USA (15 Dec 1986).

An understanding of fission product behavior during a severe core damage accident in a light water reactor is required to accurately predict the resultant radiological source term to the environment. An internationally sponsored series of four severe fuel damage (SFD) experiments was conducted in the Power Burst Facility (PBF) at the Idaho National Engineering Laboratory to characterize fission product release and transport from severely damaged nuclear fuel. The last experiment, SFD 1-4, was designed to study the behavior of fission products and aerosols generated from control rod, fuel rod cladding, and core structural materials. An online aerosol monitor was developed and installed in the test effluent line to study the time-dependent aerosol transport behavior during the experiment. The aerosol monitor consisted of two turbidity meters, used in series, to measure the attenuation of light caused by aerosols in the effluent stream. The outputs from these two attenuation cells were then used to determine the aerosol number density. The high-pressure, high-temperature, and high-radiation field environment of Test SFD 1-4 represented a unique and challenging application for this type of transducer and necessitated considerable development and testing. This paper describes the design and calibration of the aerosol monitor and discusses how the aerosol measurement results were used to aid in the interpretation of Test SFD 1-4.

32875 (NUREG/CR—4623) **In-situ stress measurements in the earth's crust in the eastern United States.** Rundle, T.A.; Singh, M.M.; Baker, C.H. (Engineers International, Inc., Westmont, IL (USA); Nuclear Regulatory Commission, Washington, DC (USA). Div. of Engineering Safety). Apr 1987. 602p. NTIS, PC A99 - GPO. File Number DE87900677.

The US Nuclear Regulatory Commission requires that the design basis for vibratory ground motion should be determined through correlation of seismicity with tectonic structures or provinces (10CFR100, Appendix A). Such criteria are difficult to apply in the eastern United States, which experiences persistent low level seismicity, with occasional moderate to large earthquakes. This report presents the results of in-situ stress measurements conducted towards reducing this uncertainty at three (3) seismically active sites in the region, namely, near Moodus, Connecticut, around the

Ramapo fault zone in New York and New Jersey, and in central Virginia. As far as possible, at each location one bore hole was drilled close to the "apparent" epicenter of the seismic activity and one outside the "known" seismic zone, so that the data obtained could be compared. The results obtained were very consistent both as to magnitude and direction. No attempt was made to correlate the in-situ stress measurements with the tectonic setting or seismic activity, since this was beyond the scope of this project. Extensive appendices report experimental data. 35 refs.

2206 Research, Test, And Experimental Reactors

REFER ALSO TO CITATION(S) 32748, 32755, 32870, 32871, 32873, 32946, 32947, 33011, 33012, 33013

32876 **(CONF-861185—13) Examination of U_3Si_2-Al fuel elements from the Oak Ridge Research Reactor.** Copeland, G.L.; Snelgrove, J.L.; Hofman, G.L. (Oak Ridge National Lab., TN (USA); Argonne National Lab., IL (USA)). 1986. Contract AC05-84OR21400. 13p. NTIS, PC A02. File Number DE87008583.

From Reduced Enrichment for Research and Test Reactors (RERTR) program international meeting; Gatlinburg, TN, USA (3 Nov 1986).

The results of postirradiation examination of low-enriched U_3Si_2 fuel elements from the Oak Ridge Research Reactor are presented. The elements replaced standard high-enriched elements and were handled routinely except that the burnup of half the elements was extended beyond normal limits up to about 98% peak. The elements were manufactured by commercial fuel suppliers. The performance was completely satisfactory for all the elements.

32877 **(DOE/ER/04207—19) Texas A and M University, Nuclear Science Center: Twenty-third progress report, January 1, 1986-December 31, 1986.** Davis, J.W.; Krohn, J.L.; Meyer, C.M.; Petesch, J.E.; Stasny, G.S. (Texas A and M Univ., College Station (USA). Texas Engineering Experiment Station). Mar 1987. Contract AC05-76ER04207. 91p. (ORO—4207-19). NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE87007767.

The Nuclear Science Center is operated by the Texas Engineering Experiment Station as a service to the Texas A & M University system and the State of Texas. The facility is available to the University, other educational institutions, government agencies, private organizations, and individuals. This report details facility utilization, operations, problems, and modifications.

32878 **(DOE/ER/10770—8) Nuclear reactor and materials science research: Technical report, May 1, 1985-September 30, 1986.** (Massachusetts Inst. of Tech., Cambridge (USA). Nuclear Reactor Lab.). 11 May 1987. Contract FG02-80ER10770. 12p. NTIS, PC A02/MF A01; GPO Dep. File Number DE87009853.

Throughout the 17-month period of its grant, May 1, 1985-September 30, 1986, the MIT Research Reactor (MITR-II) was operated in support of research and academic programs in the physical and life sciences and in related engineering fields. The reactor was operated 4115 hours during FY 1986 and for 6080 hours during the entire 17-month period, an average of 82 hours per week. Utilization of the reactor during that period may be classified as follows: neutron beam tube research; nuclear materials research and development; radiochemistry and trace analysis; nuclear medicine; radiation health physics; computer control of reactors; dose reduction in nuclear power reactors; reactor irradiations and services for groups outside MIT; MIT Research Reactor. Data on the above utilization for FY 1986 show that the MIT Nuclear Reactor Laboratory (NRL) engaged in joint activities with nine academic departments and interdepartmental laboratories at MIT, the Charles Stark Draper Laboratory in Cambridge, and 22 other universities and nonprofit research institutions, such as teaching hospitals.

32879 **(DOE/ER/75273—1) LEU conversion study for the University of Virginia 2 MW UVAR research reactor. Technical progress report, September 1, 1986-April 30, 1987.** Mulder R.U.; Rydin, R.A. (Virginia Univ., Charlottesville (USA). Dept. of Nuclear Engineering and Engineering Physics). Apr 1987. Contract FG05-86ER75273. 13p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009419.

The 2 MW UVAR research reactor, operated by the University of Virginia under NRC license R-66, is tentatively scheduled to have its HEU MTR plate-type fuel exchanged for LEU fuel in October of 1988. This date may be pushed forward if delays in DOE fuel procurement should result due to federal budget constraints. The university has sent a conversion plan to the NRC, as mandated by the so-called NRC conversion rule, which provides details about the conversion schedule and documentation for this reactor. The plan and its schedule will be reviewed and resubmitted to the NRC annually. The University of Virginia has a second reactor, the low-power 100 W CAVALIER training reactor, which will no longer be converted, as decided by the Reactor Facility management in February 1987. The CAVALIER reactor was to have been converted before the UVAR, and a conversion study was funded for this purpose by DOE (Grant No. DE-FG05-86ER75273), beginning in September of 1986. As a result of the decision to dismantle the CAVALIER instead of proceeding with its conversion, the continuation proposal for the second year of the CAVALIER study will no longer be submitted to DOE. Instead, a continuation proposal for the UVAR reactor has been prepared and is being submitted to DOE under separate cover, at this time. The UVAR conversion study will take off from the point at which the CAVALIER proposal ends. There will be no loss resulting from the merger of the studies, because the results sought for the CAVALIER are fully applicable to the UVAR. The reactors are both very similar, using the same fuel elements. The major difference is in the operating power levels.

32880 **(EPRI-NP—5132) Zirconium alloy oxidation and hydriding under irradiation: Review of Pacific Northwest Laboratories' test program results: Final report.** Johnson, A.B. Jr. (Pacific Northwest Lab., Richland, WA (USA); Electric Power Research Inst., Palo Alto, CA (USA)). Apr 1987. Contract AC06-76RL01830. 245p. NTIS, PC A11/MF A01 - Research Reports Center, Box 50490, Palo Alto, CA 94303; 1; GPO Dep. File Number DE87008528.

Radiation effects on zirconium alloy oxidation and hydriding were investigated in the Advanced Test Reactor (ATR) and Engineering Test Reactor (ETR). The investigations represent one of the largest data bases on oxidation and hydriding of zirconium alloys. Much of the data base has been published, but some results were unpublished when the federal programs terminated. Due to the renewed interest in zirconium alloy cladding behavior, the Electric Power Research Institute sponsored documentation of the unpublished results and a summary of principal results from the prior publications. The data base involves nine zirconium alloys; multiple metallurgical conditions; neutron flux levels from $\sim 10^{13}$ to 1.8×10^{14} n/cm^2.sec, > 1 MeV; fluence levels to 1.5×10^{22} n/cm^2, > 1 MeV; oxygenated and low-oxygen coolants; in flux, out-of-flux, and out-of-reactor comparisons on identical specimens; transfer of specimens exposed in one loop water chemistry to another loop chemistry; dissimilar metal combinations; investigation of surface pretreatment effects. The loop results parallel in several respects oxidation and hydriding characteristics of water reactor fuel cladding and pressure tubes. The report summarizes results on the following areas; oxidation and hydriding trends under irradiation; localized phenomena; unusual oxidation effects; dissimilar metal effects; effects of fluoride contamination; metal density changes; deposition phenomena.

32881 **(HEDL-SA—3478-FP) Transient testing of FFTF fuel pins in TREAT.** Thielges, J.R.; Alderman, C.J.; Pitner, A.L.; Culley, G.E. (Hanford Engineering Development Lab., Richland, WA (USA)). 22 Apr 1986. Contract AC06-76FF02170. 16p. (CONF-860931—19). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009514.

From International conference on reliable fuels for liquid metal reactors; Tucson, AZ, USA (7 Sep 1986).

A series of six transient tests was performed on FFTF irradiated fuel pins to demonstrate their transient performance capability. The tests were performed in the TREAT reactor using sodium loops and instrumented test trains. The TEMECH computer code was used to design overpower transients which would simulate FFTF fuel pin thermal conditions during slow and fast unprotected transients. Some tests were run to substantial overpower levels but terminated prior to fuel pin failure, while other tests were intentionally extended to fuel failure to establish failure thresholds and characteristics. Post-test examination data provided significant cladding strain and fuel melting information used for performance code calibration and validation. These data showed that cladding damage caused by fuel melting is related to the steady state condition of the fuel.

32882 **(HEDL-SA—3479-FP) Oxide fuel pin transient performance analysis and design with the TEMECH code.** Bard, F.E.; Dutt, S.P.; Hinman, C.A.; Hunter, C.W.; Pitner, A.L. (Hanford Engineering Development Lab., Richland, WA (USA)). 15 Apr 1986. Contract AC06-76FF02170. 16p. (CONF-860931—21). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009512.

From International conference on reliable fuels for liquid metal reactors; Tucson, AZ, USA (7 Sep 1986).

The TEMECH code is a fast-running, thermal-mechanical-hydraulic, analytical program used to evaluate the transient performance of LMR oxide fuel pins. The code calculates pin deformation and failure probability due to fuel-cladding differential thermal expansion, expansion of fuel upon melting, and fission gas pressurization. The mechanistic fuel model in the code accounts for fuel cracking, crack closure, porosity decrease, and the temperature dependence of fuel creep through the course of the transient. Modeling emphasis has been placed on results obtained from Fuel Cladding Transient Test (FCTT) testing, Transient Fuel Deformation (TFD) tests and TREAT integral fuel pin experiments.

32883 **(ORNL/TM—10276) Oak Ridge Research Reactor: Quarterly report, July, August, and September 1986.** Hamrick, T.P.; Ford, M.K. (Oak Ridge National Lab., TN (USA)). 1986. Contract AC05-84OR21400. 35p. NTIS, PC A03/MF A01. File Number DE87004020.

The ORR operated at an average power level of 29.9 MW for 83.9% of the time during July, August, and September of 1986. The reactor was shut down on seven occasions, six of which were scheduled. Reactor downtime needed for refueling and checks was normal. The reactor remained available for operation 86.3% of the time. Maintenance activities, both mechanical and instrument, were essentially routine in nature.

32884 **(ORNL/TM—10306) High Flux Isotope Reactor: Quarterly report, July through September 1986.** Corbett, B.L.; Farrar, M.B. (Oak Ridge National Lab., TN (USA)). Dec 1986. Contract AC05-84OR21400. 21p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87004034.

Four routine cycles of operation were completed during the second quarter. Four scheduled end-of-cycle shutdowns and four unscheduled shutdowns resulted in an on-stream time of 90.5%. The HIFI, Phase I, components were installed during the end-of-cycle 283 shutdown.

32885 **(ORNL/TM—10390) High flux isotope reactor: Quarterly report October through December 1986.** Corbett, B.L.; Farrar, M.B. (Oak Ridge National Lab., TN (USA)). Apr 1987. Contract AC05-84OR21400. 22p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87008541.

Two routine cycles of operation of the HFIR reactor were completed during the quarter. The shutdowns to end these cycles were both scheduled. The end-of-cycle 287 shutdown was extended indefinitely to investigate the embrittlement of reactor vessel materials due to radiation damage. The reactor remains down at the end of the quarter. Following the scheduled end-of-cycle 287 shutdown period, subsequent shutdown time was designated as unscheduled. The two scheduled shutdowns, fourth quarter downtime resulting from a third quarter scheduled shutdown, and the extended unscheduled shutdown account for the low 44.2% on-stream time for the quarter. The scheduled control plate replacement and vessel internals inspection was completed at the end-of-cycle 287. The inspection revealed a blister on control cylinder 9. This flaw was attributed to a manufacturing defect.

32886 **(SAND—87-0098-Vol.1) Proceedings of the Fast Burst Reactor Workshop held in Albuquerque, NM, April 8 - 10, 1986.** Luera, T.F. (Sandia National Labs., Albuquerque, NM (USA)). Feb 1987. Contract AC04-76DP00789. 238p. (CONF-860420—Vol.1). NTIS, PC A11/MF A01; 1; GPO Dep. File Number DE87009239.

From Fast burst reactor workshop; Albuquerque, NM, USA (8 Apr 1986).

Separate abstracts were prepared for the individual papers of this report. (JDB)

32887 **Monte Carlo analysis of the reflector-controlled experiments in ZPPR-14.** Misawa, T.; McKnight, R.D. (Kyoto Univ., Japan). *Transactions of the American Nuclear Society;* **52**: 623-625(1986). (CONF-860610—).

From American Nuclear Society annual meeting; Reno, NV, USA (15 Jun 1986).

Detailed Monte Carlo calculations have been made of the reflector-controlled liquid-metal reactor critical experiments performed in ZPRR-14. The principal result of the Monte Carlo study was calculation of the worth of various experimental reflector configurations. These values were compared with measured reflector worths and with results calculated with three-dimensional nodal diffusion theory and transport theory methods.

32888 **Ultra-high flux reactor design using plate fuel technology.** Lake, J.A.; Parsons, D.K.; Ryskamp, J.M.; Liebenthal, J.L.; Fillmore, G.N. (Idaho National Engineering Lab., Idaho Falls). *Transactions of the American Nuclear Society;* **52**: 645-646(1986). (CONF-860610—).

From American Nuclear Society annual meeting; Reno, NV, USA (15 Jun 1986).

The need for a new steady-state thermal neutron source of unprecedented intensity for materials science, isotope production, and fundamental physics research has been the subject of numerous national meetings and discussions. The challenge put forth by the research community is to produce a thermal neutron flux of 10^{16} n/cm^2 x s in a large accessible volume with minimum fast neutron and gamma contamination. Ultra-high-flux reactor designs based on well-characterized plate fuel technologies have been examined. A double donut core configuration extends the range of peak operating conditions, which are traditionally limited by fuel plate temperatures and thermal-hydraulic conditions in the hot channel, to a point where these flux intensity goals can be attained.

2207 Plutonium And Isotope Production Reactors

REFER ALSO TO CITATION(S) 32888, 34394, 34395, 34396, 34397, 34398, 34399, 34400

32889 **Core physics of the CNR reactor.** Difilippo, F.C. (Oak Ridge National Lab., TN). *Transactions of the American Nuclear Society;* **52**: 646-648(1986). (CONF-860610—).

From American Nuclear Society annual meeting; Reno, NV, USA (15 Jun 1986).

The need for a new generation of steady neutron sources has been the subject of several studies. The goal is to obtain a thermal neutron flux for scattering experiments between 5 to 10 times 10^{15} n/cm^2 x s. Ideally, the reactor would have a core life of at least two weeks, and it would also be used to irradiate materials and produce isotopes. This paper describes the criteria and calculations related to the preliminary design of the reactor of the proposed Center for Neutron Research (CNR). The goal for the thermal neutron flux means a factor of 6 increase with respect to two existing facilities: the High Flux Isotope Reactor (HFIR) at Oak Ridge National Laboratory and the Institute Laue-Langevin reactor (ILL) at Grenoble, France. To produce a thermal neutron flux of 10^{16} n/cm^2 x s with these designs would require a power of 600 MW for HFIR and a power of 318 MW for ILL, which would limit their core lives to 3.8 and 7.3 days, respectively. Thus higher efficiencies in

terms of thermal neutron flux per unit power are then required in order to reduce such high power requirements.

2208 Propulsion Reactors

32890 **(EGG—2468) Decontamination and decommissioning of the initial engine test facility and the IET two-inch hot-waste line.** Stoll, F.E. (Idaho National Engineering Lab., Idaho Falls (USA)). Apr 1987. Contract AC07-76ID01570. 32p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87008562.

The Initial Engine Test Decommissioning Project is described in this report. The Initial Engine Test facility was constructed and operated at the National Reactor Testing Station, now known as the Idaho National Engineering Laboratory, to support the Aircraft Nuclear Propulsion Program and the Systems for Nuclear Auxiliary Power Transient test program, circa 1950 through 1960s. Due to the severe nature of these nuclear test programs, a significant amount of radioactive contamination was deposited in various portions of the Initial Engine Test Facility. Characterizations, decision analyses, and plans for decontamination and decommissioning were prepared from 1982 through 1985. Decontamination and decommissioning activities were performed in such a way that no radiological health or safety hazard to the public or to personnel at the Idaho National Engineering Laboratory remains. These decontamination and decommissioning activities began in 1985 and were completed in 1987. 13 figs.

2209 Reactor Safety

REFER ALSO TO CITATION(S) 32812, 32813, 32836, 32852, 32853, 32874, 33335, 33669, 33670, 33671, 33672, 33673, 33717, 33721, 33751

32891 **(BNL-NUREG—39412) Thermal-hydraulic studies on molten core-concrete interactions.** Greene, G.A. (Brookhaven National Lab., Upton, NY (USA); Nuclear Regulatory Commission, Washington, DC (USA)). Oct 1986. Contract AC02-76CH00016. 14p. (CONF-8610135—62). NTIS, PC A02/MF A01 - GPO. File Number TI87006905.

From 14. water reactor safety information meeting; Gaithersburg, MD, USA (27 Oct 1986).

This report discusses studies carried out in connection with light water power reactor accidents. Recent assessments have indicated that the consequences of molten-core concrete interactions dominate the considerations of severe accidents. The two areas of interest that have been investigated are interlayer heat and mass transfer and liquid-liquid boiling. Interlayer heat and mass transfer refers to processes that occur within a core melt between the stratified, immiscible phases of core oxides and metals. Liquid-liquid boiling refers to processes that occur at the melt-concrete on melt-coolant interface. (JDH)

32892 **(BNL-NUREG—39596) Seismic fragility levels of nuclear power plant equipment.** Bandyopadhyay, K.K.; Hofmayer, C.H. (Brookhaven National Lab., Upton, NY (USA)). 1987. Contract AC02-76CH00016. 6p. (CONF-870636—8). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87008719.

From 5. national congress on pressure vessels and piping; San Diego, CA, USA (28 Jun 1987).

Seismic fragility levels of safety-related electrical and mechanical equipment used in nuclear power plants are discussed. The fragility level is defined as the vibration level corresponding to initiation of equipment malfunctions. The test response spectrum is used as a measure of this vibration level. The fragility phenomenon of an equipment is represented by a number of response spectra corresponding to various failure modes. Analysis methods are described for determination of the fragility level by use of existing test data. Useful conversion factors are tabulated to transform test response spectra from one damping value to another. Results are presented for switch-gears and motor control centers. The capacity levels of these equipment assemblies are observed to be limited by malfunctioning of contactors, motor starters, relays and/or switches. The applicability of the fragility levels, determined in terms of test response spectra, to Seismic Margin Studies and Probabilistic Risk Assessments is discussed and specific recommendations are provided.

32893 **(CEA-CONF—8723) Estimation of beta and gamma radiation doses during an accident occurring in a pressurized water reactor for the qualification of materials.** Henry, H.; Le Meur, M.; Rousseau, L.; Diop, C.; Le Dieu Deville, A.; Nimal, J.C. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Inst. de Protection et de Surete Nucleaire). Oct 1986. 16p. (In French). (CONF-860908—42). NTIS (US Sales Only), PC A02/MF A01. File Number DE87751815.

From Operability of nuclear power systems in normal and adverse environments meeting; Albuquerque, NM, USA (29 Sep 1986).

This paper presents a calculation method developed to allow a realistic evaluation of the ambiant doses susceptible of being met inside the containment building of a French pressurized water reactor during a loss of primary coolant accident. The internal mechanical structures situated inside the building are taken into account; the present method allows their modelling, and considers, with some simplifications, heat transfer mechanisms and the distribution of the radioactive products released by the reactor core during the accident.

32894 (CONF-860932—, pp 19-27) **Use of radiological accident experience in establishing appropriate perspectives in emergency planning.** Selby, J.M.; Moeller, D.W.; Vallario, E.J.; Stephan, J.G. (Pacific Northwest Lab., Richland, WA). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

Within a nuclear facility, an emergency can range from a situation that only involves the employees of that facility to a series of events that have both onsite and offsite consequences. Analyses of nuclear and non-nuclear emergencies can provide valuable information on the causes of, as well the problems encountered during emergencies. Reports on facility emergencies indicate that up to 90% involve human error. Such events occur more frequently during the night shifts or on weekends. These occurrences may result from the absence of experienced personnel as well as the reduced alertness of onsite personnel. Therefore, this paper emphasizes the human element in a review of accidents that have occurred at nuclear facilities including Windscale, SL-1, The Recuplex criticality, the Wood River Junction criticality, the Browns Ferry fire, Three Mile Island, and Chernobyl. These accidents are described, and their consequences are evaluated. The information obtained from these evaluations may be useful for inclusion in nuclear plant operating and testing procedures.

32895 (CONF-860932—, pp 29-37) **Chronology of the Chernobyl-4 accident.** McPherson, G.D. (Dept. of Energy, Washington, DC). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

This paper presents a chronological description of the events leading to the April 25, 1987, accident at the Chernobyl Unit 4 reactor at Pripyat in the Soviet Union.

32896 (CONF-860932—, pp 47-49) **Emergency planners, look back at TMI-2.** Long, R.L. (GPU Nuclear Corp., Parsippany, NJ). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

This paper looks back at emergency preparedness and response lessons learned while going through the TMI-2 Accident crisis. It is based on the author's active role as a GPU response team participant and on the results of a two-day workshop conducted by GPU Nuclear to assess the lessons learned, both from the accident and the evolution of emergency preparedness programs following the accident. Generally, the focus is on areas not covered in depth by various regulatory requirements and guidelines.

32897 (CONF-860932—, pp 53-61) **Source terms derived from analyses of hypothetical accidents, 1950-1986.** Stratton, W.R. (Stratton & Assoc., Los Alamos, NM). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

This paper reviews the history of reactor accident source term assumptions. After the Three Mile Island accident, a number of theoretical and experimental studies re-examined possible accident sequences and source terms. Some of these results are summarized in this paper.

32898 (CONF-860932—, pp 63-72) **Radiological source term estimation methods.** Owczarski, P.C.; Ballinger, M.Y.; Mishima, J.; Ayer, J.E. (Pacific Northwest Lab., Richland, WA). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

Pacific Northwest Laboratory is developing methods for estimating and size distribution of aerosols generated from potential accidents in nuclear fuel cycle facilities. These accidents include fires, explosions, spills, pressurized releases, tornadoes, and criticalities. Experiments have been performed investigating releases from fires, some types of explosions, and spills. Using data from the experiments and information from published literature, models and computer codes are being developed to estimate airborne source terms from all the accidents listed above. These methods will be part of an Accident Analysis Handbook to be published in 1987.

32899 (CONF-860932—, pp 67-72) **Changing perspectives on severe accident source terms.** Denning, R.S.; Cybulskis, P.; DiSalvo, R. (Battelle Columbus Div., OH). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

Subsequent to the TMI-2 accident, knowledge of severe accident processes which influence source terms has expanded dramatically. The methods of analysis that have been developed or are under development are more mechanistic and are better supported by experimental data. The uncertainties in source terms are large, however. Considering the magnitude of these uncertainties, it is unlikely that in the near future it can be demonstrated with a high degree of confidence that source terms have been reduced to the degree of confidence that source terms have been reduced to the degree that early fatalities or early injuries cannot occur in a severe accident. Although it is appropriate at this time to review source term based regulations, it is not clear that substantial relaxation of regulatory criteria will result. Point estimates of source terms should not be used without full consideration of the associated uncertainties. Furthermore, the magnitude of the source terms is affected not only by the processes of radionuclide release and transport, but by the timing and mode of containment failure and by the performance of containment safety systems such as sprays, suppression pools, icebeds, and air coolers. Thus there is now increased awareness of the potential benefits of accident management to reduce the consequence of severe accidents.

32900 (CONF-860932—, pp 73-78) **NRC perspective on severe accident consequence assessment.** McKenna, T.; Martin, J.A. (Nuclear Regulatory Commission, Washington, DC). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

One of the major roles of the Nuclear Regulatory Commission (NRC) during a severe accident (core melt) is to monitor the reactor licensee to assure that they are recommending the appropriate protective actions to offsite officials. Initial protective action recommendations should be made by the plant staff based on predetermined instrument readings (emergency action levels) that indicate the status of plant systems(s) required to protect the public. The determination of the need for additional protective action may require dose assessments/projections. In the past dose assessments have been based on licensee estimates of releases based on the stack monitor reading. This is not adequate because severe accident releases cannot be characterized by the stack monitor. Dose assessments should consider the probable range of accident conditions and not just the relationship of stack monitor readings to doses. This paper will summarize the basis for the NRC perspective on consequence assessment and the tools used to monitor licensee consequence assessment and protective action recommendations.

32901 (CONF-860932—, pp 95-100) **Mobile robot response to actions associated with the release of hazardous materials.** Meieran, H.B. (HB Meieran Assoc., Pittsburgh, PA). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

This paper presents a rational and composite summary of tasks and missions that could be assigned to mobile robots and other teleoperated devices in response to accidental releases of radioactive and other hazardous/toxic materials to the environment. This paper will also discuss specific missions that have been, or could be, assigned to mobile robots operating at the TMI-2 and Chernobyl-4 nuclear power plant sites. Other items and issues that will also be considered are: availability of applicable mobile robot units, expendability/durability/decontamination, portability/maneuverability/mobility, communication techniques, power supply, and artificial intelligence/autonomous navigation interactions.

32902 (CONF-860932—, pp 101-102) **Communications systems for emergency deployment applications.** Gladden, C.A. (EG & G Energy Measurements, Inc., Las Vegas, NV). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

The Emergency Response Team (ERT) communications system was developed by the US Department of Energy (DOE) to provide radio and telecommunications service for scientific and management elements located in, and adjacent to, an emergency area. The telephone system consists of six nodes, interconnected via microwave links that support T-1 data links and simultaneous two-way live video. The radio network is a self-contained VHF system arranged around portable and programmable repeaters. The system is comprised of approximately 183 DES voice-private radios and 168 clear text radios. Capability is available in the form of portable International Maritime Satellite (INMARSAT) terminals that allow direct dial access to coast earth stations in the US or other countries.

32903 (CONF-860932—, pp 109-112) **Developing a comprehensive and accountable data base after a radiological accident.** Berry, H.A.; Burson, Z.G. (EG & G Energy Measurements, Inc., Las Vegas, NV). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

After a radiological accident occurs, it is highly desirable to promptly begin developing a comprehensive and accountable environmental database both for immediate health and safety needs and for long-term documentation. The need to assess and evaluate the impact of the accident as quickly as possible is always very urgent, the technical integrity of the data must also be assured and maintained. Care must therefore be taken to log, collate, and organize the environmental data into a complete and accountable database. The key components of database development are summarized as well as the experience gained in organizing and handling environmental data acquired during: 1. TMI (1978). 2. The St. Lucie Reactor Accident Exercise (through the Federal Radiological Measurement and Assessment Center (FRMAC), March 1984). 3. The Sequoyah Fuels Inc., Uranium Hexafluoride Accident near Gore, Oklahoma (January 1986). 4. Chernobyl Reactor Accident in Russia (April 1986).

32904 (CONF-860932—, pp 123-125) **Integrated emergency response program at the Savannah River Plant.** Benjamin, R.W. (Savannah River Lab., Aiken, SC). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

The Savannah River Plant (SRP) has an emergency response system to evaluate rapidly the possible consequences of a release of toxic or radioactive pollutants to the atmosphere or to the onsite streams. This system is based upon a strong research and development technology, and computer simulation. The path, extent, and concentration of a pollutant are predicted by a computer system linked to field instrumentation, and monitored by a mobile laboratory and sample collection teams. Field measurements, using a nontoxic tracer gas, serve as emergency response exercises and provide an extensive data base with which to test atmospheric dispersion codes.

32905 (CONF-860932—, pp 127-130) **Savannah River Plant emergency response: operations and exercises.** Hoel, D.D. (Savannah River Lab., Aiken, SC). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

The Savannah River Plant is a complete nuclear complex with reactors, fuel fabrication, and fuel reprocessing onsite. Due to the potential for unplanned releases, an emergency response program has been developed to provide information on release consequences. The automated system was developed initially as a real-time site-specific system for the prediction and analysis of atmospheric and aquatic releases. However, it is flexible and has application for incidents at offsite facilities as well. The emergency response system, its components, equipment and capabilities, and the emergency response program, procedures and activities are presented. This includes the special case of joint response with Georgia Power Company's Vogtle Electric Generating Plant.

32906 (CONF-860932—, pp 145-148) **Meeting NUREG-0737, II.B.3 requirements - backup analysis of post-accident samples.** Hardt, T.L.; Bradley, M.J.; Phillips, T.E. (Babcock & Wilcox Co., Lynchburg, VA). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

The Babcock & Wilcox Company has in place a multiparticipant program designed specifically to meet the requirements of NUREG-0737, II.B.3 for offsite analysis of backup, post accident samples. This paper provides a brief review of B & W's experience in analyzing the Three Mile Island (TMI-2) Nuclear Station post accident samples and the subsequent establishment of the Post Accident Sample Analysis Program to meet NUREG-0737 requirements. Highlighted are the program's Emergency Protocol and its contribution to effective emergency planning. The paper also reviews the technical requirements for analyzing and handling post-accident samples. Specifically, the methods for analyzing low-levels of chlorides in a highly borated sample and the problems associated with transporting post-accident samples will be addressed.

32907 (CONF-860932—, pp 149-159) **Evaluation of emergency systems for the monitoring, sampling, and analysis of reactor coolant, containment atmosphere, and airborne effluents.** Hull, A.P.; Knox, W.H.; White, J.R. (Brookhaven National Lab., Upton, NY). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

A post-implementation review has been made in NRC Region I of the post-accident sampling systems (PASS), the gaseous effluent monitors, and provisions for sampling effluent particulates and radioiodines, which were required by the NRC subsequent to the TMI-2 accident (NUREG-0737). Prefabricated PASSs were predominant. Problems included inadequate purge times, separation of dissolved gases, excessive dilution, and the accuracy of analytical techniques in the presence of interferences. Microprocessor-controlled high-range gas monitors with integral provisions for sampling particulates and radioiodines in high concentrations were widely used. Calibration information was generally insufficient for the unambiguous conversion of monitor reading to release rates of a varying post-accident mixture of radiogases. The referenced sampling guidance (ANSI-N 13.1-1969) was inappropriate for the long sampling lines customarily used. Generic research is needed to establish the behavior of particulates and radioiodines in these lines.

32908 (CONF-860932—, pp 161-165) **State-of-the-art approach to emergency preparedness - remote monitoring of nuclear power plants.** Blackburn, J.A.; Parker, M.C. (Illinois Dept. of Nuclear Safety, Springfield). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

Immediately following the nuclear accident at Three Mile Island, the State of Illinois began to design a state-of-the-art emergency preparedness system for the thirteen nuclear power reactors within its borders. This system incorporates an on-line reactor parameter data communication link, an on-line automated isotopic gaseous effluent monitoring system, and gross gamma monitors installed around each site. Liquid effluent monitors will soon be installed also. The sensitivities and capabilities of this remote monitoring system have been clearly demonstrated both during abnormal events at the reactor sites and during emergency preparedness exercises. These experiences readily illustrate the system's ability rapidly to provide comprehensive, technical data to the department's staff should an accident occur at an Illinois reactor site.

32909 (CONF-860932—, pp 169-175) **Computer-assisted emergency preparedness and response.** Morentz, J.W. (Research Alternatives, Inc., Rockville, MD). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

No tool available to emergency planners and response personnel offers more actual and potential management capability improvement than the microcomputer. The low cost, fast access speed, data format flexibility, data manipulation versatility, and color graphic display clarity make the microcomputer - when applied appropriately - an extraordinary resource for the emergency manager to draw upon. A computer program called the Emergency Information System is in use around several nuclear power plants. The system helps describe and clarify situations at a nuclear facility for knowledgeable observers. It is used for communication with surrounding jurisdictions, and is even linked into state emergency operations centers where the broadest emergency decisions are made. The EIS uses computer-generated maps to display evacuation routes and merges the graphic displays with several data bases of value to emergency planners: special populations, resources, traffic control, alert lists, plans, and others. The microcomputer, operating along or in a network of up to 20 computers, provides real-time decision support to emergency response operations staff.

32910 (CONF-860932—, pp 175-180) **FEMA's Integrated Emergency Management Information System (IEMIS).** Jaske, R.T.; Meitzler, W. (Federal Emergency Management Agency, Washington, DC). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

FEMA is implementing a computerized system for use in optimizing planning, and for supporting exercises of these plans. Called the Integrated Emergency Management Information System (IEMIS), it consists of a base geographic information system upon which analytical models are superimposed in order to load data and report results analytically. At present, it supports FEMA's work in offsite preparedness around nuclear power stations, but is being developed to deal with a full range of natural and technological accident hazards for which emergency evacuation or population movement is required.

32911 (CONF-860932—, pp 181-186) **MAPSS Nuclear Emergency Management System.** Price, H.A. Jr.; Sadler, L.D.; Johnson, R.W. Jr. (MAPSS Corp., Knoxville, TN). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

With the MAPSS NEMS in place, a distinctly higher level of confidence is imparted to the emergency personnel managing a nuclear plant accident. The graphics are unique and are the same throughout all levels of response. Standard Operating Procedures are available instantly to all personnel, and system security provides

partitioning of critical levels of command as well as documentation of all actions taken through the emergency. Maintenance is reduced to a very simple level and the entire system operates at meaningful life saving speed.

32912 (CONF-860932—, pp 187-192) **Comparison of computerized dose projection models and their impact on protective action decision making.** Reilly, S.M. (NUTECH Engineers, Inc., Bethesda, MD). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

The increased use of computers at nuclear power plants provides more accurate and timely assessment of conditions and consequences during emergency situations. Dose projection has been one of the prime beneficiaries of this new technology, and the resulting calculations have a direct impact on protective action decision-making. In this paper, a quantitative comparison of three dose projected doses can vary from factors of 2-3 up to factors of 100 or more for similar input conditions. The impact on protective action recommendations that vary from no action to evacuation.

32913 (CONF-860932—, pp 193-196) **Importance ranking of various aspects of offsite radiological emergency preparedness.** Hockert, J.W.; Carter, T.F. (International Energy Assoc. Ltd., Albuquerque, NM). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

Under contract to the Edison Electric Institute, IEAL developed a method to assess the relative importance of various aspects of offsite radiological emergency preparedness. The basic approach involved structuring the 35 objectives that the Federal Emergency Management Agency expects offsite emergency planners to demonstrate during nuclear power plant emergency preparedness exercises into a hierarchy based upon the emergency response capabilities they support. The analytical hierarchy process (AHP) was employed to derive the quantitative relative importance of each of the 35 objectives based upon its contribution to the overall capability of offsite agencies to assist in protecting public health and safety in the event of an emergency at a nuclear power plant. The judgments of a cross-section of state and local emergency planners, federal regulators, and intervenors were solicited to rank the 35 objectives.

32914 (CONF-860932—, pp 197-208) **Goal-oriented functional tree structure for nuclear power plant emergency preparedness.** Calabrese, R.V.; Roush, M.L. (Univ. of Maryland, College Park). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

Guidelines for development and implementation of emergency response plans do not provide the planner/implementer with an adequate overview of the functions to be achieved or a measure of their relative importance. To provide a framework in which this importance can be recognized, understood and quantified, a logical goal oriented tree structure has been developed which integrates and gives a clear visual representation of the functions required to meet the emergency preparedness objective. The tree considers a spectrum of both high and low probability events which may require mitigation both onsite and offsite. The ultimate objective: to Minimize the Ill Effects of a Nuclear Power Plant Incident is satisfied by functions concerned with prevention and mitigation of human injury and property damage. A complete and detailed structure which specifies the subfunctions and success paths which satisfy these functions has been developed. Institutional activities such as planning, training, procedure development, monitoring and decision making do not enter the tree directly. Instead, the logic structure defines the extent to which these activities must be considered and the information systems and decision models required for successful implementation of the plan. The top structure of the tree is presented and a few branches are considered in detail. The impact of institutional activities, information systems, etc. is discussed. Tree quantification is considered.

32915 (CONF-860932—, pp 209-214) **Results of the early NRC analyses of the radiological monitoring data from the Chernobyl accident.** Hogan, R.; McKenna, T. (Nuclear Regulatory Commission, Washington, DC). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

This paper describes the work of one group of the NRC task force for the Chernobyl accident during the first two weeks following the accident. This group focused on organizing the available environmental measurement data into a data base which could be used to gain insights into the consequence throughout Europe and the scope of accident.

32916 (CONF-860932—, pp 215-221) **ARAC: a centralized computer-assisted emergency planning, response, and assessment system for atmospheric releases of toxic material.** Dickerson, M.H.; Knox, J.B. (Lawrence Livermore National Lab., CA). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

The Atmospheric Release Advisory Capability (ARAC) is an emergency planning, response, and assessment service, developed by the US Departments of Energy and Defense, and focused, thus far, on atmospheric releases of nuclear material. For the past 14 years ARAC has responded to over 150 accidents, potential accidents, and major exercises. The most notable accident responses are the COSMOS 954 reentry, the Three Mile Island (TMI-2) accident and subsequent purge of ^{85}Kr from the containment vessel, the recent UF_6 accident at the Kerr-McGee Plant, Gore, Oklahoma, and the Chernobyl nuclear reactor accident in the Soviet Union. Based on experience in the area of emergency response, developed during the past 14 years, this paper describes the cost effectiveness and other advantages of a centralized emergency planning, response, and assessment service for atmospheric releases of nuclear material.

32917 (CONF-860932—, pp 223-224) **Digital imagery manipulation and transmission for emergency deployment applications.** Gladden, C.A.; Phillipson, D.S. (EG & G Energy Measurements, Inc., Las Vegas). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

The Digital Imagery Transmission System (DITS) was designed as a replacement for the other slow-scan system. DITS is an interactive microcomputer graphics system capable of digitizing maps or photographs. Digitized images are stored on a local area network file server and can then be distributed to other units on the system or be transmitted over a dial-grade phone line to a remote sites where other DITS terminals exist. A DITS terminal consists of an inexpensive microcomputer, and off-the-shelf RGB monitor and an electronic drawing device for entering overlay data. Hard-copy prints can be obtained in minutes.

32918 (CONF-860932—, pp 225-227) **Image/data storage, manipulation, and recall using video/computer technology for emergency applications.** Thorpe, J.M. (EG & G Energy Measurements, Inc., Las Vegas, NV). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

Employing a blend of broadcast video and state-of-the-art computer technology the Management Emergency Response Information System (MERIS) is designed to control, manipulate, and distribute the graphic and visual information necessary for decision-making in an emergency response situation or exercise. Instant storage and recall of an extensive library of frames of video imagery allow emergency planners the time and freedom to examine necessary information quickly and efficiently.

32919 (CONF-860932—, pp 229-235) **Using MENU-TACT for estimating radionuclide releases during a reactor emergency.** Sjoreen, A.L. Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

MENU-TACT is a computer code designed to estimate potential atmospheric releases of radionuclides from the reactor complex during a reactor emergency. It is part of a suite of models, the Intermediate Dose Assessment System, which is used at the US Nuclear Regulatory Commission's Operations Center. MENU-TACT incorporates only those processes that can make major changes in the magnitude of a reactor release. It provides quick results of bounding calculations. MENU-TACT was written to be simple to use. Data are entered via fill-in-the-blank displays or selection of menu options. Plant-specific and generic default values for data are provided where appropriate. The code models transport of nuclides from containment through a series of volumes to the environment. The analyst controls the pathways from the volumes to the environment, timing of events, and depletion parameters, along with other required data.

32920 (CONF-860932—, pp 237-240) **MESORAD dose assessment model.** Scherpelz, R.I.; Ramsdell, J.V.; Athey, G.F.; Bander, T.J. (Pacific Northwest Lab., Richland, WA). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

MESORAD is a dose assessment code developed for use as an emergency response tool by the US Nuclear Regulatory Commission and the US Department of Energy. The codes combines atmospheric dispersion and dose calculations to make dose estimates for releases containing as many as 50 radionuclides. It evaluates those dose pathways that are likely to be important during and immediately following a release. The pathways included are the internal dose commitment that is due to inhalation of radionuclides and the external dose that is caused by exposure to radionuclides in the air and deposited on the ground. External doses are computed using either the semi-infinite cloud approximation or the finite puff model. The finite puff model as developed to reduce computational time and is an approximation to the point-kernel integration technique found in other dose models. Initialization of MESORAD requires about 5 minutes, and simulation of the first 3 hours of a release can be completed in about an additional 3 minutes on a superminicomputer.

32921 (CONF-860932—, pp 247-249) **REALM: an expert system for classifying emergencies.** Touchton, R.A.; Gunter, A.D.; Cain, D.G. (Technology Applications, Inc., Jacksonville, FL). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

In late 1983, EPRI began a program to encourage and stimulate the development of Artificial Intelligence Applications for the nuclear industry. As a part of that effort, EPRI has contracted Technology Applications, Inc., (TAI) to develop an artificially intelligent Emergency Classification system Prototype. This paper presents a description of and a status report on the recently completed prototype.

32922 (CONF-860932—, pp 253-258) **Perspectives on the economic risks of LWR accidents.** Ritchie, L.T.; Burke, R.P. (Sandia National Labs., Albuquerque, NM). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

Models which can be used for the analysis of the economic risks from events which may occur during LWR operation have been developed. The models include capabilities to estimate both onsite and offsite costs of LWR events ranging from routine plant forced outages to severe core-melt accidents resulting in a large release of radioactive material to the environment. The economic consequence models have been applied in studies of the economic risks from the operation of US LWR plants. The results of the analyses provide some important perspectives regarding the economic risks of LWR accidents. The analyses indicate that economic risks, in contrast to public health risks, are dominated by the onsite costs of relatively high-frequency forced outage events. Even for severe (e.g., core-melt) accidents, expected offsite costs are less than expected onsite costs for a typical US plant.

32923 (CONF-860932—, pp 265-269) **NRC's rulemaking to require materials licensees to be financially responsible for cleanup of accidental releases.** Seeman, M.J. (Nuclear Regulatory Commission, Washington, DC). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

On June 7, 1985, the US Nuclear Regulatory Commission (NRC) published an advance notice of proposed rulemaking (ANPRM) in the Federal Register to address funding for cleanup of accidents and unexpected decontamination by certain materials licensees. The NRC asked for public comment to help them determine whether to amend its regulations to require certain materials and fuel cycle licensees to demonstrate that they possess adequate financial means to pay for cleanup of accidental releases of radioactive materials. If licensees lack adequate financial resources and funds are to available for prompt cleanup, the consequences could be potentially significant for the public, the licencee and the federal government. The purpose of this paper is to explain the purpose and scope of the Commission's proposed regulatory action, as well as describing several accidents that made the Commission consider this action. Additionally, the paper will address other regulatory precedents. Finally, the paper will conclude by generally characterizing the public comments and items of concern raised by commenters.

32924 (CONF-860932—, pp 271-272) **Applicability of Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) to releases of radioactive substances.** Miller, S.R. (Dept. of Energy, Washington, DC). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), commonly called Superfund, provided a $1.6 billion fund (financed by a tax on petrochemical feedstocks and crude oil and by general revenues) for the cleanup of releases of hazardous substances, including source, special nuclear or byproduct material, and other radioactive substances, from mostly inactive facilities. The US Environmental Protection Agency (EPA) is authorized to require private responsible parties to clean up releases of hazardous substances, or EPA, at its option, may undertake the cleanup with monies from the Fund and recover the monies through civil actions brought against responsible parties. CERCLA imposes criminal penalties for noncompliance with its reporting requirements. This paper will overview the key provisions of CERCLA which apply to the cleanup of radioactive materials.

32925 (CONF-860932—, pp 273-276) **Price-Anderson - where we've been, where we're going.** Dinitz, I. (Nuclear Regulatory Commission, Washington, DC). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

The Price-Anderson Act, which became law on September 2, 1957, as part of the Atomic Energy Act of 1954, provides a system to pay funds for claims by members of the public for personal injury and property damage resulting from a nuclear accident. The Act as it now operates entails a two-part insurance system for large utility licensees. The first consists of $160 million in primary nuclear liability insurance purchased by utilities operating large nuclear power plants. Under the second part, these utilities could be assessed up to $5 million per reactor per accident for damages exceeding $160 million. With 101 large power reactors now licensed, the primary and secondary insurance presently totals $665 million. The present Price-Anderson Act expires on August 1, 1987. There are presently two bills H.R. 3653 and S. 1225 being actively considered by the Congress for modification and extension of Price-An-

derson. Hearings have been held and the two bills have been marked up and reported out by the Senate and House oversight committees.

32926 (CONF-860932—, pp 279-282) **Protective action guides: rationale, interpretation, and status.** Logsdon, J.E. (Environmental Protection Agency, Washington, DC). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

The Environmental Protection Agency (EPA) is developing Protective Action Guides (PAGs) for responding to radiological emergencies. The existing interim guidance for plume exposure pathways is 0.01 to 0.05 Sv (1 to 5 rems) whole body dose equivalent and 0.05 to 0.25 Sv (5 to 25 rems) committed dose equivalent to the thyroid from a 2 to 4 day exposure. Interim PAGs for ingestion exposure pathways are 0.015 to 0.15 Sv (1.5 to 15 rems) committed dose equivalent to the thyroid and 0.005 to 0.05 Sv (0.5 to 5 rems) committed dose equivalent to the whole body or any other organ from a one-year exposure. Draft Relocation PAGs have been proposed as a range of 0.01 to 0.05 Sv (1 to 5 rems) committed effective dose equivalent from the first year exposure to deposited radioactive material from all exposure pathways except ingestion of food and water. The guidance (i.e., PAGs for plume, ingestion, and relocation; limits for emergency workers and other persons entering restricted zones; and guidance for development of recovery criteria) is reviewed with regard to status, values, rationale, interpretation and implementation.

32927 (CONF-860932—, pp 283-285) **Federal radiological emergency response plan.** Adler, V. (Federal Emergency Management Agency, Washington, DC). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

This paper describes the development of the Federal Radiological Emergency Response Plan and its application.

32928 (CONF-860932—, pp 287-289) **Role of the Federal Radiological Monitoring and Assessment Center (FRMAC) following a radiological accident.** Doyle, J.F. III. (EG & G Energy Measurements, Inc., Las Vegas, NV). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

The Federal Radiological Emergency Response Plan (FRERP) calls for the Department of energy to establish a Federal Radiological Monitoring and Assessment Center (FRMAC) immediately following a major radiological accident to coordinate all federal off-site monitoring efforts in support of the State and the Cognizant Federal Agency (CFA) for the facility or material involved in the accident. Some accidents are potentially very complex and may require hundreds of radiation specialists to ensure immediate protection of the public and workers in the area, and to identify priorities for the Environmental Protection Agency (EPA) long-term efforts once the immediate protective actions have been carried out. The FRMAC provides a working environment with today's high technology tools (i.e., communication, computers, management procedures, etc.) to assure that the State and CFA decision makers have the best possible information in a timely manner on which to act. The FRMAC planners also recognize an underlying responsibility to continuously document such operations in order to provide the State, the CFA, and the EPA the technical information they will require for long term assessments. In addition, it is fully recognized that information collected and actions taken by the FRMAC will be subjected to the same scrutiny as other parts of the accident and the overall response.

32929 (CONF-860932—, pp 291-294) **Exercising the federal radiological emergency response plant.** Gant, K.S.; Adler, M.V.; Wolff, W.F. Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

Multi-agency exercises were an important part of the development of the Federal Radiological Emergency Response Plan. This paper concentrates on two of these exercises, the Federal Field Exercise in March 1984 and the Relocation Tabletop Exercise in December 1985. The Federal Field Exercise demonstrated the viability and usefulness of the draft plan; lessons learned from the exercise were incorporated into the published plan. The Relocation Tabletop Exercise examined the federal response in the post-emergency phase. This exercise highlighted the change over time in the roles of some agencies and suggested response procedures that should be developed or revised.

32930 (CONF-860932—, pp 297-302) **New source terms and the implications for emergency planning requirements at nuclear power plants in the United State.** Kaiser, G.D.; Cheok, M.C. (NUS Corp., Gaithersburg, MD). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

This paper begins with a brief review of current approaches to source term driven changes to NRC emergency planning requirements and addresses significant differences between them. Approaches by IDCOR and EPRI, industry submittals to NRC and alternative risk-based evaluations have been considered. Important issues are discussed, such as the role of Protective Action Guides in determining the radius of the emergency planning zone (EPZ). The significance of current trends towards the prediction of longer warning times and longer durations of release in new source terms is assessed. These trends may help to relax the current notification time requirements. Finally, the implications of apparent support in the regulations for a threshold in warning time beyond which ad hoc protective measures are adequate is discussed.

32931 (CONF-860932—, pp 303-306) **Coordination between NRC and FEMA: emergency preparedness issues of current interest.** Podolak, E.M. Jr. (Nuclear Regulatory Commission, Washington, DC). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

The framework for cooperation between the Nuclear Regulatory Commission (NRC) and the Federal Emergency Management Agency (FEMA) is formally defined in an April 18, 1985 Memorandum of Understanding. Basically, FEMA coordinates all Federal planning for the offsite impact of radiological emergencies and takes the lead for resolving offsite emergency preparedness issues and NRC dose the same for onsite emergency preparedness. This paper describes the efforts of both agencies to coordinate offsite and onsite emergency preparedness issues through the NRC/FEMA Steering Committee on Emergency Preparedness. The current status of several site-specific and generic emergency preparedness issues, such as offsite medical services, night-time emergency notification, consideration of earthquakes in emergency planning and ingestion pathway guidance, will be described.

32932 (CONF-860932—, pp 307-312) **Interactions between multiple organizations responding to a reactor accident in Switzerland.** Baggenstos, M.; Isaak, H.P. (Swiss Nuclear Safety Inspectorate, Wuerenlingen). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

The poster deals with the problems that emerge from the distribution of responsibilities in the case of a nuclear accident. It is demonstrated how clear and simple procedures and good co-ordination between the onsite and offsite emergency organizations are necessary for the smooth handling of such a situation. A good communications network is particularly essential. The special problem of co-ordination between different organizations performing measurements of the contaminated air, ground and food is also discussed. From the experience gained during the Chernobyl accident, it has been established that only those organizations, which are correctly trained and have a perspective over the complete accident situation, can perform valuable work. At the beginning of the accident for example, there was no organization responsible for taking samples covering the whole of Switzerland. A first quick assessment of the radiological situation could therefore only be made on the basis of measurements performed in the direct vicinity of the

laboratories or from single samples which had to be transported over large distances.

32933 (CONF-860932—, pp 313-318) **Utility perspective on emergency preparedness.** Giangi, G.J. (GPU Nuclear Corp., Harrisburg, PA). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

This paper discusses some of the major lessons learned from the TMI-2 accident with respect to emergency response and preparedness. A description of the GPU Nuclear Corporation emergency preparedness program is also provided to illustrate the significant differences in the program before and after the accident. While major lessons have been adopted by both government and industry there continues to be emergency preparedness related regulations and concerns that promote the misperception that nuclear power plants are unsafe. In addition, annual exercises send a message to the public and news media that most, if not all, nuclear plant emergencies will result in evacuation or sheltering of the surrounding population.

32934 (CONF-860932—, pp 319-324) **Improving emergency management through shared information processing - considerations in Emergency Operations Center design.** DeBusk, R.E.; Walker, J.A. (Virginia Polytechnic Institute and State Univ., Blacksburg). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

An Emergency Operations Center (EOC) is a shared information processing facility. Although seemingly obvious, many EOCs are designed and operated based on other criteria. The results, measured in terms of response effectiveness, are difficult to determine. A review of some recent disasters reveals a pattern of poor performance for the EOCs involved. These conclusions are tentative because so little research has been done on the design, operation, or evaluation of emergency operations centers. The EOC is not an onsite response command post but a facility removed from the response where tactical and strategic decisions are made based on information from the response site and elsewhere. The EOC is therefore the central focus of emergency information processing and higher-level decision making. Examining existing EOCs, several common functions emerge. These functions can be described in terms of shared information processing. However, many factors impact the design and operation of EOCs. Politics, budgets, and personal ambition are only a few such factors. Examining EOC design and operation in terms of shared information processing operationalized in the seven principal functions within the EOC provides a framework for establishing principles of EOC design and operation. In the response to emergencies such as Bhopal or Chernobyl the stakes are high. Applying new techniques and technologies of management systems can improve the probability of success. This research is a beginning step - to understand how EOCs function, to define the system. Predictive or prescriptive analysis must wait until sufficient empirical data is available to complete a descriptive model for EOC operations.

32935 (CONF-860932—, pp 325-327) **NRC operation center's function.** Weiss, E.W. (Nuclear Regulatory Commission, Washington, DC). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

The Nuclear Regulatory Commission has maintained a 24-hour-a-day, 365 days-a-year, manned Operations Center since the emergency incident at the Three Mile Island Nuclear Power Plant in 1979. The Center functions as the NRC's point of direct communication through dedicated telephone lines for reports of significant events at licensed nuclear power plants and certain fuel cycle facilities. The Center has become a key element in the agency's emergency preparedness. The effectiveness of the NRC Operations Center depends in large measure on complete and accurate reports from the licensees. The information provided is used to: identify generic safety issues and precursor events that may compromise plant safety; develop licensee performance trends that are used to adjust NRC regulatory emphasis; and, evaluate and provide for the appropriate NRC response to events in a real time mode.

32936 (CONF-860932—, pp 345-347) **National emergency medical assistance program for commercial nuclear power plants.** Linnemann, R.E.; Berger, M.E. (Radiation Management Consultants, Philadelphia, PA). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

Radiation Management Consultant's Emergency Medical Assistance Program (EMAP) for nuclear facilities provides a twenty-four hour emergency medical and health physics response capability, training of site and off-site personnel, and three levels of care for radiation accident victims: first air and rescue at an accident site, hospital emergency assessment and treatment, and definitive evaluation and treatment at a specialized medical center. These aspects of emergency preparedness and fifteen years of experience in dealing with medical personnel and patients with real or suspected radiation injury will be reviewed.

32937 (CONF-860932—, pp 351-355) **Evacuation behavior in nuclear power plants emergencies: an alternative perspective.** Sorensen, J.H. Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

It is alleged that the Governor's advisory at TMI led to spontaneous evacuation and overresponse. Several researchers have called this the shadow phenomenon. This phenomenon, however, rests on assumptions that are challenged by this paper. Instead, it is concluded that evacuation behavior at TMI was consistent with the authors general understanding of human behavior in disasters. Emergency planners should be more concerned with underresponse to a nuclear power plant emergency than with overresponse.

32938 (CONF-860932—, pp 357-361) **Warning human populations of technological hazard.** Rogers, G.O.; Nehnevajsa, J. (Univ. of Pittsburgh, PA). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

Warning people of an impending hazard seeks to make them aware of the threat and to elicit actions that would minimize the dangers to life and property. Because technological and natural hazards differ in important ways, the alerting and notification process for technological and natural hazards is also different. One of the differences rests in the ability of people to detect many natural hazards in a direct sensory manner; technological hazards often make such detection more difficult. For example, detection of radiological releases without instrumentation is nearly impossible, but even with tornadoes where warning is notoriously difficult, people are at least able to use their senses to detect the potential for hazard. Hence, warning for technological hazards is in some ways more problematic, generally representing a rather rapid shift from normalcy to emergency. This paper builds on the significant foundation of natural hazard warning research in developing a model of warning suitable for technological hazards. This model specifically examines immediate cascading, or networking, of the warning signal and message, so often reported in the natural hazard literature. The implications for technological and natural hazard warnings systems are examined.

32939 (CONF-860932—, pp 363-365) **Emergency preparedness training for local communities.** Cooley, M.J.; Thompson, K.K. (Detroit Edison Co., Newport, MI). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

Detroit Edison, in cooperation with Monroe County, has developed a comprehensive training program for local emergency workers in the area surrounding the Fermi 2 Nuclear Power Plant. Using expertise from both organizations, a program consisting of two videotapes, two slide-tapes and nine narrated slide series was produced to address the worker-specific training needs of county emergency workers. In June of 185, the program was approved by

Detroit Edison and the Monroe County Board of Commissioners. To date, Monroe County has trained more than 1000 emergency workers. This program has been so well received that the county staff has developed and presented a modified version of this program to the general public. The result of this cooperative effort is increased public confidence in emergency preparedness at the state, local and utility level and a renewed spirit of cooperation and trust between the utility and local units of government.

32940 (CONF-860932—, pp 367-372) **Emergency planning, public information, and the media: some recent experiences.** Goldman, S.B. (NUTECH, Inc., Bethesda, MD). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

Within the last two years, events at several nuclear plants generated national media attention. Most were classified as unusual events or alerts. One event necessitated a site area emergency classification. None of these events posed a hazard to the general public, yet each posed a serious threat to the credibility of the utilities. These and other events show that (1) media response to a nuclear technical severity of the accident and (2) utilities must have in place effective and coordinated emergency public information programs, particularly for lower level emergency classifications.

32941 (CONF-860932—, pp 373-375) **Factors influencing media coverage of a radiological incident.** Bernhardt, R.K.; O'Neill, L.J. (Reynolds Electrical & Engineering Co., Inc., Las Vegas, NV). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

Most organizations have an existing policy for interactions with the media. This policy often requires that interactions by with or through a professional group of public information officers or the Office of Public Affairs. This policy tends to give individual members of an organization the belief that they are not responsible or in some instances, even allowed to interact with the media. To achieve good media relationships and/or coverage, individual interactions are necessary and required. The guidelines for media interactions provided in the Federal Emergency Management Agency (FEMA) sponsored Radiological Emergency Response course are relatively straight forward and simple to adopt.

32942 (CONF-861102—32) **Heat radiation through steam in direct containment heating.** Condiff, D.W.; Cho, D.H.; Chan, S.H. (Argonne National Lab., IL (USA); Wisconsin Univ., Milwaukee (USA). Dept. of Mechanical Engineering). 1986. Contract W-31109-ENG-38. 7p. NTIS, PC A02/MF A01; GPO Dep. File Number DE87004821.

From American Nuclear Society and Atomic Industrial Forum joint meeting; Washington, DC, USA (16 Nov 1986).

In current discussions of the direct heating of containment atmospheres (DCH) during a hypothetical severe accident in certain PWR's, involving meltdown and discharge via steam blowdown of substantial core materials (corium) from primary into secondary containment, there is concern about the potential for containment loading resulting from the release of large amounts of thermal energy from the airborne corium debris or aerosol directly to the containment atmosphere in sufficient quantities to cause overpressurization. The purpose of this study is to provide some preliminary indications based upon existing correlations, data, models, about transmission of high temperature radiant heat through steam at distances and conditions of significance to DCH.

32943 (CONF-870306—12-Summ.) **Waste management for Shippingport Station Decommissioning Project: Extended summary.** Mullee, G.R.; Schulmeister, A.R. (General Electric Co., San Jose, CA (USA). Nuclear Energy Business Operations). 1987. Contract AC06-76RL01857. 4p. NTIS, PC A02/MF A01; GPO Dep. File Number DE87003460.

From Waste management '87; Tucson, AZ, USA (1 Mar 1987).

The Shippingport Station (SSDP) is demonstrating that the techniques and methodologies of waste management, which are currently employed by the nuclear industry, provide adequate management and control of waste activities for the decommissioning of a large scale nuclear plant. The SSDP has some unique aspects in that as part of the objective to promote technology transfer, multiple subcontractors are being utilized in the project. The interfaces resulting from multiple subcontractors require additional controls. Effective control has been accomplished by the use of a process control and inventory system, coupled with personnel training in waste management activities. This report summarizes the waste management plan and provides a status of waste management activities for SSDP.

32944 (CONF-870406—, pp II.4.1-II.4.9) **Nuclear power plant training from the insurers viewpoint.** Honey, J.A. Apr 1987. NTIS, PC A21/MF A01. File Number DE87008378.

From 7. symposium on training of nuclear facility personnel; Orlando, FL, USA (27 Apr 1987).

American Nuclear Insurers and Mutual Atomic Energy Liability Underwriters (ANI/MAELU) provides the liability insurance policy that responds to the Price Anderson Act. The policy covers liability claims brought by the general public and third party radiation workers resulting from operation of a nuclear facility. The authors all recognize the important role training plays in the continued safe operation of nuclear power plants. Training also plays a key role in liability claims evaluation and their defense. This paper deals with the importance of training programs in reducing the number of liability claims and the defense of those claims. ANI/MAELU has some unique concerns in that regard.

32945 (CONF-870418—2) **The safety implications of control systems program at ORNL.** Smith, O.L. (Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 9p. NTIS, PC A02. File Number DE87006378.

From Topical meeting on anticipated and abnormal transients in nuclear power plants; Atlanta, GA, USA (12 Apr 1987).

Simulations of two pressurized water reactors (PWRs) point to several conclusions that bear on the principle interests of Unresolved Safety Issue A-47: (1) the simulated control systems of both plants exhibit considerable ability to respond to the investigated classes of off-normal disturbances; (2) overfill of the steam generators usually produced only minor cooling of the primary side; (3) despite protective features, substantial amounts of water could be injected into the steam lines because of low steam quality or high water level, but further analysis is needed to determine whether this creates the potential for water-hammer damage or other mass or momentum effects; and (4) potential core-uncovery scenarios explored steam generator tube rupture and other small breaks that might lead to loss of primary inventory without actuation of high pressure injection. The results indicated situations in which automatic actuation of high pressure injection would terminate the leak and others in which operator intervention appeared necessary.

32946 (CONF-870418—3) **Plant inherent control testing in EBR-II.** Chang, L.K.; Mohr, D.; Feldman, E.E.; Planchon, H.P. (Argonne National Lab., IL (USA)). 1987. Contract W-31-109-ENG-38. 5p. NTIS, PC A02/MF A01; GPO Dep. File Number DE87007000.

From Topical meeting on anticipated and abnormal transients in nuclear power plants; Atlanta, GA, USA (12 Apr 1987).

A testing program is being conducted in EBR-II to demonstrate passive, inherent reactor protection and control. Data obtained from tests have indicated that the reactor power can be controlled over a large range by the primary coolant flow, secondary coolant flow, and the turbine/generator load. Reactor safety could then be based on inherent safe characteristics of the plant rather than the complicated reactor shutdown system. A Plant Inherent Control Testing (PICT) program is being developed in EBR-II to investigate inherent control concepts for LMR's. The reactor power will be controlled between 40 and 100% power with the primary coolant pumps, the secondary coolant pumps, and the turbine admission valve. The thermal-hydraulic-neutronic system analysis code NATDEMO was used for the pretest predictions of the EBR-II plant response. This paper presents the results of this analysis.

32947 **(CONF-870424—10) Results and implications of the EBR-II inherent safety demonstration tests.** Planchon, H.P.; Golden, G.H.; Sackett, J.I.; Mohr, D.; Chang, L.K.; Feldman, E.E.; Betten, P.R. (Argonne National Lab., IL (USA)). 1987. Contract W-31109-ENG-38. 22p. NTIS, PC A02/MF A01; GPO Dep. File Number DE87006991.

From American Nuclear Society international meeting on advances in reactor physics, mathematics and computation; Paris, France (27 Apr 1987).

On April 3, 1986 two milestone tests were conducted in Experimental Breeder Reactor-2 (EBR-II). The first test was a loss of flow without scram and the second was a loss of heat sink without scram. Both tests were initiated from 100% power and in both tests the reactor was shut down by natural processes, principally thermal expansion, without automatic scram, operator intervention or the help of special in-core devices. The temperature transients during the tests were mild, as predicted, and there was no damage to the core or reactor plant structures. In a general sense, therefore, the tests plus supporting analysis demonstrated the feasibility of inherent passive shutdown for undercooling accidents in metal-fueled LMRs. The results provide a technical basis for future experiments in EBR-II to demonstrate inherent safety for overpower accidents and provide data for validation of computer codes used for design and safety analysis of inherently safe reactor plants.

32948 **(CORR—87-0046-Del.Ver.) Reactor incident status 1981 annual report.** Kiser, S.H. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Plant). 29 Jan 1982. Contract AC09-76SR00001. 113p. NTIS MF A01; 2; GPO Dep. File Number DE87006288.

Reactor Incident followup action is summarized through periodic status reports. This annual report summarizes action taken or anticipated for Reactor Incidents through December 1981. Incidents for which action has been completed, have been deleted from the report. Quarterly addende will update the report by tabulating incidents for each three month period through the coming year. The report consists of a part for the P, K, and C Reactors. Each reactor part is divided into three sections: Further Technical Analysis or Followup Needed; Funding and/or Implementation Needed; and No Further Technical Analysis Anticipated.

32949 **(DEMO—86/10G) Chernobyl nuclear accident and its consequences in Greece - Report No. 2.** (National Research Centre for the Physical Sciences Democritos, Athens (Greece)). Dec 1986. 74p. (In Greek). NTIS (US Sales Only), PC A04/MF A01. File Number DE87702258.

7 maps.

In the present report realistic estimations about the nuclear accident at Chernobyl and the radioactivity burdening of Greece from the radioactive releases of the accident are presented. Results of radioactivity measurements in Greece concerning the environment and the food chain are given and some estimations for the population doses and the expected consequences of the accident are made. (J.K.).

32950 **(EGG-M—32386) Progress with algorithm and vector/parallel enhancements for RELAP5/MOD2 thermohydraulic system simulation code.** Makowitz, H.; Wagner, R.J. (EG and G Idaho, Inc., Idaho Falls (USA)). 1987. Contract AC07-76ID01570. 13p. (CONF-870424—13). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009722.

From American Nuclear Society international meeting on advances in reactor physics, mathematics and computation; Paris, France (27 Apr 1987).

Earlier experience resulting from attempts to develop a parallel implementation, and a vector implementation for RELAP5/MOD1, using super computers, resulted in an analysis suggesting a five to ten times performance enhancement for future versions of the code. The MOD2 version of the code, presently available, uses a six equation model (vs five equations in MOD1) with the option of a semi-implicit or nearly-implicit numerical solution scheme. The nearly-implicit numerical scheme violates the convective (material) Courant limit. The RELAP5/MOD2 code has been implemented on CDC Cyber 176, CRAY 1S and CRAY X-MP/48 computers. Algorithm performance enhancements and vector performance improvements have been measured and are analyzed for these three computing machines. The reactor small break loss-of-coolant problem used in previous studies, was employed as the basis for the present analysis. Previous studies performed to compare the performance of algorithms in MOD2 are compared to MOD1, using the two presently available numerical methods in MOD2. Planned vector and parallel enhancements are discussed in the context of past studies, and expected future performance gains. Applicability of the RELAP5 code to "best estimate" real time simulations and nuclear power plant simulators is discussed.

32951 **(EGG-RTH—7506) Review and evaluation of the RELAP5YA computer code and the Vermont Yankee LOCA [Loss-of-Coolant Accident] licensing analysis model for use in small and large break BWR [Boiling Water Reactor] LOCAS.** Jones, J.L. (EG and G Idaho, Inc., Idaho Falls (USA)). Jan 1987. Contract AC07-76ID01570. 86p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE87009083.

A review has been completed of the RELAP5YA computer code to determine its acceptability for performing licensing analyses. The review was limited to Boiling Water Reactor (BWR) reactor applications. In addition, a Loss-Of-Coolant Accident (LOCA) licensing analysis method, using the RELAP5YA computer code, has been reviewed. This method is applicable to the Vermont Yankee Nuclear Power Station to perform full break spectra LOCA and fuel cycle independent analyses. The review of the RELAP5YA code consisted of an evaluation of all Yankee Atomic Electric Company (YAEC) incorporated modifications to the RELAP5/MOD1 Cycle 18 computer code from which the licensing version of the code originated. Qualifying separate and integral effects assessment calculations were reviewed to evaluate the validity and proper implementation of the various added models. The LOCA licensing method was assessed by reviewing two RELAP5YA system input models and evaluating several small and large break qualifying transient calculations. A review of the RELAP5YA code modifications and their assessments, as well as the submitted LOCA licensing method, is given and the results of the review are provided.

32952 **(EPRI-NP—2511-CCM-A-Vol.4) VIPRE [Versatile Internals and Component Program for Reactors; EPRI]-01: A thermal-hydraulic code for reactor cores: Volume 4, Applications: Final report.** Cuta, J.M.; Stewart, C.W.; Koontz, A.S.; Montgomery, S.D. (Pacific Northwest Lab., Richland, WA (USA); Electric Power Research Inst., Palo Alto, CA (USA)). Apr 1987. Contract AC06-76RL01830. 623p. NTIS, PC A99/MF A01 - Research Reports Center, Box 50490, Palo Alto CA 94303; 1; GPO Dep. File Number DE87009370.

VIPRE (Versatile Internals and Component Program for Reactors; EPRI) has been developed for nuclear power utility thermal-hydraulic analysis applications. It is designed to help evaluate nuclear reactor core safety limits including minimum departure from nucleate boiling ratio (MDNBR), critical power ratio (CPR), fuel and clad temperatures, and coolant state in normal operation and assumed accident conditions. This volume (Volume 4: Applications) contains extensive comparisons of VIPRE calculations to experimental data. There are also sensitivity studies and evaluations of code numerical and computational performance. In addition, calculations performed by member utilities using VIPRE for comparisons with transient CHF data, and FSAR plant analyses are presented. Comparisons are also presented of plant thermal-hydraulic calculations with VIPRE and other COBRA codes. These calculations demonstrate the suitability of VIPRE for PWR core thermal-hydraulic analysis.

32953 **(HEDL-SA—3616-FP) Nonlinear piping damping and response predictions.** Severud, L.K.; Weiner, E.O.; Lindquist, M.R.; Anderson, M.J.; Wagner, S.E. (Hanford Engineering Development Lab., Richland, WA (USA)). Oct 1986. Contract AC06-76FF02170. 20p. (CONF-8610135—61). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87005475.

From 14. water reactor safety information meeting; Gaithersburg, MD, USA (27 Oct 1986).

The high level dynamic testing of four prototypic piping systems, used to provide benchmarks for analytical prediction com-

parisons, is overviewed. The size of pipe tested ranged from one-inch to six-inches in diameter and consisted of carbon steel or stainless steel material. Failure of the tested systems included progressive gross deformation or some combination of ratchetting-fatigue. Pretest failure predictions and post test comparisons using simplified elastic and elasto-plastic methods are presented. Detailed nonlinear inelastic analyses are also shown, along with a typical ratchet-fatigue failure calculation. A simplified method for calculating modal equivalent viscous damping for snubbers and plastic hinges is also described. Conclusions are made regarding the applicability of the various analytical failure predictive methods and recommendations are made for future analytic and test efforts.

32954 **(INIS-mf—10617) Experimental analysis of the behaviour of iodine in the event of hypothetical accidents. Final report. Pt. 1. Droplet carry-over.** Richter, F.; Rippel, R.; Proebstle, G.; Fernholz, O. (Kraftwerk Union A.G., Erlangen (Germany, F.R.). Werkstoffe und Chemie; Technische Hochschule Aachen (Germany, F.R.). Inst. fuer Dampf- und Gasturbinen). 1986. 96p. (In German). NTIS (US Sales Only), PC A05/MF A01. File Number DE87751894.

Experiments have been performed simulating hypothetical core-melt accidents in order to determine droplet-bound transport of radio-nuclides. Different measurement methods have been applied to evaluate steam moisture and droplet size distribution, the carry-over factor of a tracer substance, and, to some extent, droplet velocity, under atmospheric sump water boiling conditions. Part flow analysis yields carry-over factor values on the order of magnitude 10/sup -5/. Thus it is smaller than would be expected from visual measurements of steam moisture in the main flow, a result which is due to droplet velocity characteristics which limit the carry-over through openings. Results distinctly show that steam moisture (10/sup -3/ up to 7 x 10/sup -5/, depending on the distance from the sump) and the droplet size (4-57 μm) can only be used as a source term. In order to evaluate the quantity released from a leakage, a supplementary investigation of droplet carry-over mechanisms will be required. With 5 refs., 18 tabs., 34 figs.

32955 **(INIS-mf—10625) Investigation of the load characteristic for soft missile impact and results of the Meppen test I/5 to I/9. 4. technical report.** Ruediger, E.; Riech, H.; Renz, E. (Hochtief A.G. fuer Hoch- und Tiefbauten, Frankfurt am Main (Germany, F.R.). Abt. Kerntechnischer Ingenieurbau). Jul 1985. 413p. (In German). NTIS (US Sales Only), PC A18/MF A01. File Number DE87751900.

The test description contains the records of the time dependant measurements and the state of deformation of the missiles before and after the tests. The calculation model used for the evaluation of the tests consists of two linked models: I. Calculation model reproducing the dynamic behaviour of the test set up. II. Calculation model simulating the impact behaviour of deformable missiles. The evaluation shows a continuous relation between impact velocity and impact load, impact time and missile deformation; a good correlation of calculated and measured values, specially for the force of the impact load cell; that the discrepancies between the impact force and the impact load cell force are negligible small. It is concluded, that the missile model simulates the impact process of deformable missiles in a correct manner. Application of the described model requires the knowledge of the mass and the crushing load distribution of the projectile.

32956 (INIS-mf—10902, pp 20-21) **Neutron physical investigation on the water ingress in gas-cooled pebble-bed reactors.** Mueller, H.; Ninaus, W.; Oswald, K.; Rabitsch, H.; Schuerrer, F.; Neef, R.D. (Technische Univ., Graz, Austria; Kernforschungsanlage Juelich G.m.b.H., Germany, F.R.). Dec 1986. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702298.

In Annual report (October 1985 - September 1986).

32957 (INIS-mf—10902, pp 22-23) **Neutron physics of absorber balls as a scram system in a high-temperature reactor.** Mueller, H.; Ninaus, W.; Oswald, K.; Schuerrer, F.; Sgouridis, S.; Neef, R.D.; Schaal, H. (Technische Univ., Graz, Austria; Kernforschungsanlage Juelich G.m.b.H., Germany, F.R.). Dec 1986. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702298.

In Annual report (October 1985 - September 1986).

32958 (INIS-mf—10907, pp 478-487) **Probability analysis of nuclear power plant hazards.** Kovacs, Z. (Vyskumny Ustav Palivoenergetickeho Komplexu, Bratislava, Czechoslovakia). 1985. (In Slovak). NTIS (US Sales Only), PC A08/MF A01. File Number DE87780126. (CONF-8506352—Pt.2).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

The probability analysis of risk is described used for quantifying the risk of complex technological systems, especially of nuclear power plants. Risk is defined as the product of the probability of the occurrence of a dangerous event and the significance of its consequences. The process of the analysis may be divided into the stage of power plant analysis to the point of release of harmful material into the environment (reliability analysis) and the stage of the analysis of the consequences of this release and the assessment of the risk. The sequence of operations is characterized in the individual stages. The tasks are listed which Czechoslovakia faces in the development of the probability analysis of risk, and the composition is recommended of the work team for coping with the task. (J.C.).

32959 (INIS-mf—10907, pp 552-560) **Graph method analysis of SKODA SOS SUPERPROTECTION circuit.** Marko, M. (Vyzkumny Ustav Energeticky, Tanvald, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A08/MF A01. File Number DE87780126. (CONF-8506352—Pt.2).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

A method and computer program were developed for determining the probability indicators of system reliability for systems composed of technological units and control installations, e.g., nuclear power plants. The efficiency of the method is demonstrated on the example of the SOS technical protection circuit using the method of evaluated oriented graph. The probability of the resulting states of the system is determined using the GRAS program by the following methods (the choice is made by the analyst): the method of listing , the reduced method of listing corrected by Monte Carlo and the reduced method of listing where the probability of the set number of the most probable elementary events (e.g., 2000) is sorted out. The GRAS program with a variant for sorting out 2000 of the most probable elementary events was used for the calculation of probabilities and the dangerous SOS failure. The value of the probability of a safe failure of the system considered as a unit unrepaired for 7000 hrs is 0.0030, the probability of a dangerous failure under the same conditions is 0.7706. (J.P.).

32960 (INIS-mf—10907, pp 379-384) **System CIS 3000 in trial and experimental practice.** Jukl, M. 1985. (In Czech). NTIS (US Sales Only), PC A08/MF A01. File Number DE87780126. (CONF-8506352—Pt.2).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

The CIS 3000 information system previously described whose central processing unit is the ADT 4100 minicomputer was used for testing the performance of reactor accident protection mechanisms, for modelling regimes in the reactor core on an electrically heated fuel element mock-up and for the research of processes taking place during reactor flooding in a loss-of-coolant accident. The CIS system allows real-time monitoring and processing of data from up to several hundreds of sensors simultaneously. A configuration with two basic ADT units was used for the experiments. Two programs were written: 1. the RETIN program operates in real time, reads input data and carries out the calculation of the required variables and the display of values on monitors; 2. the MESR program performs rapid measurements, stores the values of required variables in the memory and evaluates them after termination of the experiment. Both programs also test the values of variables given in the list of protected variables defined by the operator, and in case of need provide the implementation of a control measure thereby protecting costly experimental equipment from destruction. (A.K.).

32961 (INIS-mf—10907, pp 385-394) **Analysis of accident situations of WWER-440 reactors due to reactivity changes.** Jurecka, J.; Tinka, I. (Energoprojekt, Prague, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A08/MF A01. File Number DE87780126. (CONF-8506352—Pt.2).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

The approach is discussed to the evaluation of accident situations caused by a failure of control and protection systems and the assessment of the consequences of the most probable adverse initiation event. The key parameters of accident analyses with a reactivity change are characteristics of reactivity insertion, power distribution in the reactor core, reactivity coefficients, kinetic parameters, and heat transfer through the fuel-cladding gap. The determination of these characteristics is part of the report on neutron physical characteristics incorporated in the preliminary safety report. In case of a change-in-reactivity accident, technical, organizational and accident protection measures are taken. The following accident types are discussed: uncontrolled sliding-up of control assembly groups, ejection of the control assembly, entry of cold water into the reactor core, uncontrolled reduction in H_3BO_3 concentration, sudden release of boron sediments from the structure of the reactor core. Calculation analyses show that the accidents can only have grave consequences in case of a complete break-down of the accident protection. (J.C.).

32962 (INIS-mf—10907, pp 417-428) **Analysis of failures due to component malfunction in WWER-440 nuclear power plant.** Kolinko, M.; Mueller, V. (Energoprojekt, Prague, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A08/MF A01. File Number DE87780126. (CONF-8506352—Pt.2).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

Computer programs are given which were used for modelling failure states. Some important failures are summed up for the nuclear unit as are responses of the reactor control and protection system (blockage of coolant flow through the fuel assembly, outages of circulation pumps and seizures of the rotor of the main pump, failures of turbogenerators, of high-pressure regeneration of feedwater and of the main feed pumps). The design analyses of the said situations have shown that the correct functioning of the control and protection systems in all considered cases is the condition for the transition of the nuclear unit into a new steady state regime. (J.C.).

32963 (INIS-mf—10907, pp 488-490) **Simulator of WWER-440 nuclear power plant unit.** Krcek, V. (ORGREZ, Brno, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A08/MF A01. File Number DE87780126. (CONF-8506352—Pt.2).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

A full range simulator for Czechoslovak nuclear power plants is described. It is the only simulator in the CMEA countries simulating a WWER-440 unit with a V 213 reactor and is built solely using Czechoslovak components and instruments. The computer system is based on a combination of centralized digital data processing and a decentralized set of special electronic modules. The simulator allows to simulate in real time all important operating systems and components of the unit in all modes including failure and accident states. Simulation models are assembled on the basis of a simplified description of physical laws governing the technological processes. The entire software has a modular structure and was built at the assembler level. (J.C.).

32964 (INIS-mf—10908, pp 700-707) **Use of hybrid model in safety analyses of WWER-type nuclear power plants.** Sedlacek, J.; Mueller, V.; Zatloukal, J. 1985. (In Czech). NTIS (US Sales Only), PC A07/MF A01. File Number DE87780127. (CONF-8506352—Pt.3).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

The development is described of hybrid model SIMOD developed jointly by the UVZU and ZES units of the Skoda Plzen enterprise for safety analyses of failure modes of WWER type nuclear power plant operation. A simple block diagram illustrates the analog and digital simulation of the individual circuits and components of the nuclear power unit and their interaction in relation to the control and protection system of the reactor and the unit. Simulated selected failure states of the nuclear power unit became the basis for processing safety documentation for the V-2 and Dukovany nuclear power plants with WWER-440 reactors. Methods are indicated for the verification of the computer program and its possible standardization. The basic trends are outlined in the development of the model for safety analyses of nuclear power units with WWER-1000 reactors.

32965 **(Juel—2091) Fission product release profiles from spherical HTR fuel elements at accident temperatures.** Schenk, W.; Pitzer, D.; Nabielek, H. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorwerkstoffe). Oct 1986. 142p. (In German). NTIS (US Sales Only), PC A07/MF A01. File Number DE87751923.

A total of 22 fuel elements with modern TRISO particles has been tested in the temperature range 1500-2500/sup 0/C. Additionally, release profiles of iodine and other isotopes have been obtained with seven UO/sub 2/ samples at 1400-1800/sup 0/C. For heating times up to 100 hours at the maximum temperature, the following results are pertinent to HTR accident conditions: Ag 110 m is the only fission products to be released at 1200-1600/sup 0/C by diffusion through intact SiC, but it is of low significance in accident assessments; cesium, iodine, strontium, and noble gas releases up to 1600/sup 0/C are solely due to various forms of contamination; at 1700-1800/sup 0/C, corrosion induced SiC defects cause the release of Cs, Sr, I/Xe/Kr; above 2000/sup 0/C, thermal decomposition of the silicon carbide layer sets in while pyrocarbons still remain intact. Around 1600/sup 0/C, the accident specific contribution of cesium, strontium, iodine, and noble gases is negligible.

32966 **(KFK—4182) DEMONA. Annual report 1985.** Schoeck, W. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Lab. fuer Aerosolphysik und Filtertechnik 1; Eidgenoessisches Inst. fuer Reaktorforschung, Wuerenlingen (Switzerland); Battelle-Institut e.V., Frankfurt am Main (Germany, F.R.); Kraftwerk Union A.G., Erlangen (Germany, F.R.); Gesellschaft fuer Reaktorsicherheit m.b.H. (GRS), Garching (Germany, F.R.)). Dec 1986. 115p. (In German). (BF-R—65.523-12; EIR—592; GRS-A—1252; KWU-R—917/86/107). NTIS (US Sales Only), PC A06/MF A01. File Number DE87751926.

The DEMONA program is conducted to DEMOnstrate Nuclear Aerosol behavior in large scale experiments. It is to be shown that the NAUA aerosol code is capable of describing sufficiently well the typical aerosol behavior during accidents in pressurized water reactors. DEMONA will also contribute to the validation of the thermodynamics codes COCMEL and FIPLOC. The experiments are carried out in the model containment facility at Battelle Frankfurt which is a quarter scale model of the Biblis A containment. The geometric and thermodynamic properties of the model containment allow a realistic simulation of the conditions during core melt accidents. In 1985, 18 tests were done to develop and optimize aersol generation techniques for tin oxide, silver and iron oxide aerosols. With these aerosols and with mixtures of them 4 main experiments were carried out. The thermodynamic conditions were also varied.

32967 **(NUREG—1002-Suppl.3) Safety Evaluation Report related to the operation of Braidwood Station, Units 1 and 2 (Docket Nos. 50-456 and 50-457).** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation). May 1987. 33p. NTIS, PC A03/MF A01 - GPO. File Number TI87900730.

In November 1983, the staff of the Nuclear Regulatory Commission issued its Safety Evaluation Report (NUREG-1002) regarding the application filed by the Commonwealth Edison Company, as applicant and owner, for a license to operate Braidwood Station, Units 1 and 2 (Docket Nos. 50-456 and 50-457). The first supplement to NUREG-1002 was issued in September 1986; the second supplement to NUREG-1002 was issued in October 1986. This third supplement to NUREG-1002 reports the status of certain

items that remained unresolved at the time Supplement 2 was published. The facility is located in Reed Township, Will County, Illinois.

32968 **(NUREG—1261) Technical specifications, Braidwood Station, Unit Nos. 1 and 2 (Docket Nos. STN 50-456 and STN 50-457): Appendix "A" to License No. NPF-70.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation). May 1987. 487p. NTIS, PC A21/MF A01. File Number TI87900736.

The Braidwood Station, Unit Nos. 1 and 2, Technical Specifications were prepared by the US Nuclear Regulatory Commission to set forth the limits, operating conditions, and other requirements applicable to a nuclear reactor facility as set forth in Section 50.36 of 10 CFR Part 50 for the protection of the health and safety of the public. 18 figs., 55 tabs.

32969 **(NUREG—1265) Uncertainty papers on severe accident source terms.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Regulatory Research). May 1987. 192p. NTIS, PC A09/MF A01 - GPO. File Number TI87900729.

Separate abstracts were prepared for the individual papers in this report. (JDB)

32970 (NUREG/CP—0054, pp 12-41) **Empirical prediction of free-field ground motion using statistical regression models.** Campbell, K.W. (Geological Survey, Golden, CO). 1986. NTIS, PC A18/MF A01. File Number TI87004201. (BNL-NUREG—52011; CONF-8606250—).

From Workshop on soil-structure interaction; Bethesda, MD, USA (16 Jun 1986).

The analysis of soil-structure interaction (SSI) requires a knowledge of free-field ground motion in the vicinity of structure. The manner in which this free-field motion is estimated can have an important influence on the formulation of the SSI problem. It has particular importance in the nuclear industry where SSI is included in the licensing process. Several methods are currently used to estimate free-field ground motion. One of the more common methods, and that discussed here, is the use of statistical regression to develop strong-motion attenuation relationships. There are several important questions regarding the development and application of this method that are addressed in this paper. These are: (1) what are the capabilities, limitations and uncertainties associated with the method? (2) How should the method incorporate source effects, propagation effects, local site effects, ground-motion parameters, and high-frequency motions in a low-magnitude event? (3) How should correlations between the three components of motion be treated? The intent of this paper is to discuss those aspects of the problem that relate specifically to the estimation of free-field ground motion, leaving the reader to refer to these other papers for a more complete discussion of the method.

32971 (NUREG/CP—0054, pp 42-77) **Uncertainties in the estimates of seismic ground motion at a site made using the site specific spectra approach.** Bernreuter, D.L.; Chen, J.C. (Lawrence Livermore National Lab., CA). 1986. NTIS, PC A18/MF A01. File Number TI87004201. (BNL-NUREG—52011; CONF-8606250—).

From Workshop on soil-structure interaction; Bethesda, MD, USA (16 Jun 1986).

This paper describes the site specific spectra (SSP) approach used by NRC as one of its checks in the safety assessment of nuclear power plants. The SSSP approach is placed in the context of other methods for estimating the ground motion at a site. The sources of uncertainty are categorized and estimates of the contribution to the total uncertainty from each category are made. SSSP are developed for deep soil and rock sites for MM VII and MM VIII SSE levels to cover many of the cases for sites in the eastern US.

32972 (NUREG/CP—0054, pp 78-90) **Random-vibration models of free-field seismic ground motion for soil-structure interaction.** McGuire, R.K. (Risk Engineering, Inc., Golden, CO). 1986. NTIS, PC A18/MF A01. File Number TI87004201. (BNL-NUREG—52011; CONF-8606250—).

From Workshop on soil-structure interaction; Bethesda, MD, USA (16 Jun 1986).

Various methods are used to estimate seismic ground motion for soil-structure interaction (SSI) analyses at nuclear power plants, depending on the specific application. Where data are abundant, as on the west coast of the US, empirical procedures have been applied to predict various measures of ground shaking. To estimate ground motions for magnitudes and distance ranges that are not well-documented with data even on the west coast, numerical procedures that account for characteristics of the fault rupture and the wave travel path have been developed and used. In regions such as eastern North America (ENA) where recordings of strong seismic shaking are few, other methods have been applied with some success. Both in the regions where data are sparse and where they are abundant, random vibration (RV) representations of ground motion have been developed and applied in recent years with considerable success. This method characterizes seismic shaking as a stochastic process with a defined frequency content and specific assumptions about temporal behavior, from which all interesting measures of ground motion (peak parameter values, response spectra, and instrumental magnitude) can be derived with the application of RV concepts. This paper reviews some of the recent applications of RV methods and indicates some areas in which further work is appropriate. The method is also evaluated as a tool for specifying bedrock input motion for SSI analyses.

32973 (NUREG/CP—0054, pp 92-99) **Comments on ground-motion aspects of the proposed revised standard review plan.** King, J.L. (Electric Power Research Institute, Palo Alto, CA). 1986. NTIS, PC A18/MF A01. File Number TI87004201. (BNL-NUREG—52011; CONF-8606250—).

From Workshop on soil-structure interaction; Bethesda, MD, USA (16 Jun 1986).

Comments are offered on the specification of nuclear power plant design ground motions as outlined in the revised Standard Review Plan. Topics discussed are: seismological limitations of response spectra, problems with smoothed design response spectra, vertical design response spectra, amplification functions, nonlinear analyses, one-dimensionality, input motion, the Kanai-Tajimi formulation, operating basis earthquake, site specific spectra, and correlation between three components of motion.

32974 (NUREG/CP—0054, pp 101-138) **Ground motion considerations for nuclear power plant design with emphasis on soil-structure interaction aspects.** Kennedy, R.P.; Power, M.S.; Chang, C.Y. (RPK Structural Mechanics Consulting, Yorba Linde, CA). 1986. NTIS, PC A18/MF A01. File Number TI87004201. (BNL-NUREG—52011; CONF-8606250—).

From Workshop on soil-structure interaction; Bethesda, MD, USA (16 Jun 1986).

Nuclear power plant structures tend to be massive, stiff structures with fundamental frequencies in the 2 to 10 Hz range depending on oil conditions. Whereas damage to conventional structures probably correlates best with velocity content of the ground motion, the seismic vulnerability of nuclear power plants is probably more related to acceleration content. For this reason, the ground motion input for seismic design of nuclear power plants has been primarily expressed in terms of acceleration. It has often been noted, particularly in connection with near-source motions due to low-to-moderate magnitude earthquakes, that structures have performed much better than would be predicted considering the free-field instrumental peak acceleration to which the structures were subjected. In such cases, the differences in measured ground motion, design levels, and observed behavior are so great that they cannot be reconciled with typical safety factors associated with elastic seismic analyses for design even when typical ductility considerations are included. The problems with free-field instrumental peak acceleration and free-field instrumental-based elastic response spectra as measures of potential seismic damage are discussed. Because of these considerations, the US Nuclear Regulatory Commission (USNRC) has sponsored research work on the subject of engineering characterization of ground motion. This paper presents a summary of this work with emphasis on SSI and spatial variation of ground motion effects.

32975 (NUREG/CP—0054, pp 139-161) **Specification of ground motion input for SSI analyses.** Roesset, J.M. (Univ. of Texas, Austin). 1986. NTIS, PC A18/MF A01. File Number TI87004201. (BNL-NUREG—52011; CONF-8606250—).

From Workshop on soil-structure interaction; Bethesda, MD, USA (16 Jun 1986).

The effects of local soil conditions on the characteristics of the earthquake motions to which a structure may be subjected are in part dependent upon the amplitude and frequency content of the seismic motion at the free surface of a soil deposit, before any structure is built, which are functions of the soil properties in the linear elastic and the inelastic ranges. This paper is concerned primarily with this effect, however, some discussion of kinematic interaction effects and the way to model them is presented. This effect is commonly known as soil amplification although the name may be misleading, since there is in fact amplification over certain ranges of frequencies and deamplification over others.

32976 (NUREG/CP—0054, pp 163-193) **Uncertainties in soil-structure interaction analyses.** Costantino, C.J.; Kuo, P.T.; Miller, C.A.; Phillippacopoulos, A.J. (City Univ. of New York, NY). 1986. NTIS, PC A18/MF A01. File Number TI87004201. (BNL-NUREG—52011; CONF-8606250—).

From Workshop on soil-structure interaction; Bethesda, MD, USA (16 Jun 1986).

The paper includes discussion of current Standard Review Plan procedures and issues of concern relating to evaluation of soil-structure interactions on category I nuclear facilities. The information obtained in extensive field observations taken during relatively strong events at various instrument array sites located around the world is noted, including information obtained for the Fukushima nuclear plant in Japan. The adequacy of analytical approximations is assessed with respect to the equivalent linear soil constitutive model, the influence of soil saturation, and horizontal soil layering. Numerical approximations are considered with discussion centering on element size criteria, mesh size criteria, and lumped mass structural stick models. Conclusions and recommendations are presented.

32977 (NUREG/CP—0054, pp 195-212) **Licensing concerns in SSI methodology.** Hadjian, A.H. (Bechtel Power Corp., Norwalk, CA). 1986. NTIS, PC A18/MF A01. File Number TI87004201. (BNL-NUREG—52011; CONF-8606250—).

From Workshop on soil-structure interaction; Bethesda, MD, USA (16 Jun 1986).

This paper addresses some of the more immediate Nuclear Regulatory concerns in the controversial subject of soil-structure interactions in US nuclear power plant design practice. Topics covered include: choice of solution method, the need for sophisticated analyses, frequency variation, ground motion reduction with depth, and buried structures. Recommendations under consideration by NRC staff are presented.

32978 (NUREG/CP—0054, pp 213-232) **Perspectives on dynamics of soil-structure interaction.** Veletsos, A.S. (Rice Univ., Houston, TX). 1986. NTIS, PC A18/MF A01. File Number TI87004201. (BNL-NUREG—52011; CONF-8606250—).

From Workshop on soil-structure interaction; Bethesda, MD, USA (16 Jun 1986).

The primary objective of this paper is to indicate the value of simple approaches in studies of soil-structure interaction, and to review two examples of such procedures. Additional objectives are to identify what is believed to be a source of current controversies on the subject, and to present a brief account of areas of needed research. The first of the examples considered concerns the interaction effects for certain classes of building structures, whereas the second deals with the hydrodynamic effects in above-ground liquid storage tanks, and with the consequences of soil-structure interaction on the design of such systems.

32979 (NUREG/CP—0054, pp 233-250) **Site response - a critical problem in soil-structure interaction analyses for embedded structures.** Seed, H.B.; Lysmer, J. 1986. NTIS, PC A18/MF A01. File Number TI87004201. (BNL-NUREG—52011; CONF-8606250—).

From Workshop on soil-structure interaction; Bethesda, MD, USA (16 Jun 1986).

Soil-structure interaction analyses for embedded structures must necessarily be based on a knowledge of the manner in which the soil would behave in the absence of any structure - that is on a knowledge and understanding of the spatial distribution of motions in the ground within the depth of embedment of the structure. The nature of these spatial variations is discussed and illustrated by examples of recorded motions. It is shown that both the amplitude of peak acceleration and the form of the acceleration response spectrum for earthquake motions will necessarily vary with depth and failure to take these variations into account may introduce an unwarranted degree of conservatism into the soil-structure interaction analysis procedure.

32980 (NUREG/CP—0054, pp 251-259) **Stochastic response of rigid foundations.** Pais, A.L.; Kausel, E. (Laboratorio Nacional de Engenharia Civil, Lisbon, Portugal). 1986. NTIS, PC A18/MF A01. File Number TI87004201. (BNL-NUREG—52011; CONF-8606250—).

From Workshop on soil-structure interaction; Bethesda, MD, USA (16 Jun 1986).

While the study of Kinematic Interaction effects calls, in general, for advanced analytical and numerical techniques, an excellent approximation was proposed recently by Iguchi. This approximation was used by the authors to analyze embedded foundations subjected to spatially random SH-wave fields, i.e., motions that exhibit some degree of incoherence. The wave fields considered ranged from perfectly coherent motions (resulting from seismic waves arriving from a single direction) to chaotic motions resulting from waves arriving simultaneously from all directions. Additional parameters considered were the shape of the foundation (cylindrical, rectangular) and the degree of embedment. It was found that kinematic interaction usually reduces the severity of the motions transmitted to the structure, and that incoherent motions do not exhibit the frequency selectivity (i.e., narrow valleys in the foundation response spectra) that coherent motions do.

32981 (NUREG/CP—0054, pp 261-283) **EPRI research on soil-structure interaction.** Tang, H.T. (Electric Power Research Institute, Palo Alto, CA). 1986. NTIS, PC A18/MF A01. File Number TI87004201. (BNL-NUREG—52011; CONF-8606250—).

From Workshop on soil-structure interaction; Bethesda, MD, USA (16 Jun 1986).

The paper briefly discusses the background of soil-structure interaction research and identifies the nuclear industry's need for a realistic, experimentally qualified soil-structure interaction analysis methodology for nuclear power plant design to reduce excessive conservatism and stabilize the licensing process. EPRI research and joint research efforts between EPRI and Niagara Mohawk Power Corporation, Taiwan Power Company, and the Japanese Century Research Institute for Electric Power Industry are outlined. As a result of these and other research efforts, improvement in soil-structure interactions methodologies is being realized.

32982 (NUREG/CP—0054, pp 284-330) **Earthquake simulation experience and experimental observations.** Higgins, C.J.; Dass, W.C. (Applied Research Associates, Inc., Albuquerque, NM). 1986. NTIS, PC A18/MF A01. File Number TI87004201. (BNL-NUREG—52011; CONF-8606250—).

From Workshop on soil-structure interaction; Bethesda, MD, USA (16 Jun 1986).

Earthquake occurrences are widely separated in space and time. Although it is possible to observe the gross post-earthquake condition of engineered systems, there is rarely sufficient data to define the input ground motions and specific responses of important structures. A more complete data base for development and verification of models must come from well instrumented experiments. This paper discusses several topics associated with past and future

experiments related to evaluating the earthquake response of engineered systems. These topics include: desirable data; sources of available data; the SIMQUAKE experience; important structural response observations from SIMQUAKE; and a simple phenomena-based SSI model.

32983 (NUREG/CP—0054, pp 331-340) **Role of experiments in soil-structure interaction methodology verification.** Srinivasan, M.G.; Kot, C.A.; Hsieh, B.J. (Argonne National Lab., IL). 1986. NTIS, PC A18/MF A01. File Number TI87004201. (BNL-NUREG—52011; CONF-8606250—).

From Workshop on soil-structure interaction; Bethesda, MD, USA (16 Jun 1986).

Different kinds of experimental data may be useful for partial or full verification of SSI analysis methods. The great bulk of existing data comes from earthquake records and dynamic testing of as-built structures. However, much of this data may not be suitable for the present purpose as the measurement locations were not selected with the verification of SSI analysis in mind and hence are too few in number or inappropriate in character. Data from scale model testing that include the soil in the model - both in-situ and laboratory - are relatively scarce. If the difficulty in satisfying the requirements of similitude laws on the one hand and simulating realistic soil behavior on the other can be resolved, scale model testing may generate very useful data for relatively low cost. The current NRC sponsored programs are expected to generate data very useful for verifying analysis methods for SSI. A systematic effort to inventory, evaluate and classify existing data is first necessary. This effort would probably show that more data is needed for the better understanding of SSI aspects such as spatial variation of ground motion and the related issue of foundation input motion, and soil stiffness. Collection of response data from in-structure and free field (surface and downhole) through instrumentation of selected as-built structures in seismically active regions may be the most efficient way to obtain the needed data. Augmentation of this data from properly designed scale model tests should also be considered.

32984 (NUREG/CP—0054, pp 341-365) **Experimental verification of soil/structure interaction methods.** Miller, C.A.; Costantino, C.J.; Philippacopoulos, A.J. (City Univ. of New York, NY). 1986. NTIS, PC A18/MF A01. File Number TI87004201. (BNL-NUREG—52011; CONF-8606250—).

From Workshop on soil-structure interaction; Bethesda, MD, USA (16 Jun 1986).

This paper discusses some of the sources of experimental data that are available to be used on soil/structure interaction (SSI) verification studies. The data is discussed in relation to its applicability to the primary issues of SSI. Results of verification studies using two of the data sources are also presented. One data source is data collected at the Fukushima nuclear power plant during an earthquake. The second data source is the SIMQUAKE experiments during which earthquake loading was simulated with high explosive charges.

32985 (NUREG/CP—0054, pp 366-394) **Numerical - experimental approach to the S.S.I. analysis.** Castoldi, A.; Muzzi, F.; Panzeri, P.; Pezzoli, P.; Ruggeri, G.; Martelli, A.; Masoni, P. 1986. NTIS, PC A18/MF A01. File Number TI87004201. (BNL-NUREG—52011; CONF-8606250—).

From Workshop on soil-structure interaction; Bethesda, MD, USA (16 Jun 1986).

This paper describes forced excitation tests carried out on the PEC fast reactor building as well as several aspects of a complete 3D seismic response analysis. These studies focus on the soil-structure interaction problems. They have been performed by both mathematical procedures and processing of on-site experimental data. The mathematical models have been calibrated using the data obtained through the mentioned on site experimental dynamic tests on the reactor building, in order to develop a very reliable numerical model to compute the vibration levels induced by the design earthquakes and near-field earthquakes on the components and the building itself. In this way, the safety margins of the design analysis, carried out by use of simplified methods, are estimated.

32986 (NUREG/CR—3961) **Closeout of IE Bulletin 78-08: Radiation levels from fuel element transfer tubes.** Foley, W.J.; Dean, R.S.; Hennick, A. (Parameter, Inc., Elm Grove, WI (USA); Nuclear Regulatory Commission, Washington, DC (USA). Div. of Emergency Preparedness and Engineering Response). Dec 1986. 33p. NTIS, PC A03/MF A01 - GPO. File Number TI87900394.

On April 5, 1978, two radiation protection technicians accidentally entered a high radiation area adjacent to an exposed section of the fuel element transfer tube at Trojan Nuclear Power Plant. On June 12, 1978, IE Bulletin 78-08 was issued by the NRC to alert licensees to the event and to reduce the potential for serious personnel wholebody exposure due to uncontrolled access to very high radiation areas. Holders of operating licenses for power and non-power (research and test) reactors with fuel element transfer tubes were required to take specific actions and report results. Evaluation of licensees' responses and NRC/IE inspection reports and memorandums shows that the bulletin can be closed out per specific criteria for 61 (92%) of the 66 operating power facilities and for all of the 64 operating non-power facilities affected by the bulletin. Followup items for the remaining five (5) power facilities are proposed for use by NRC/IE, to document inspection commitments and to ensure satisfactory completion of required action. Conclusions are presented and remaining areas of concern are identified.

32987 (NUREG/CR—4550-Vol.5) **Analysis of core damage frequency from internal events: Sequoyah, Unit 1.** Bertucio, R.C.; Moore, D.L.; Held, J.T.; Leahy, T.J.; Harper, F.T. (Sandia National Labs., Albuquerque, NM (USA); Nuclear Regulatory Commission, Washington, DC (USA). Div. of Reactor Systems Safety). Feb 1987. Contract AC04-76DP00789. 422p. (SAND—86-2084-Vol.5). NTIS, PC A18/MF A01 - GPO. File Number TI87009189.

This document contains the accident sequence analyses for Sequoyah, Unit 1, one of the reference plants being examined as part of the NUREG-1150 effort by the Nuclear Regulatory Commission (NRC). NUREG-1150 will document the risk of a selected group of nuclear power plants. As part of that work, this report contains the overall core damage frequency estimate for Sequoyah, Unit 1, and the accompanying plant damage state frequencies. Sensitivity and uncertainty analyses provided additional insights regarding the dominant contributors to the Sequoyah core damage frequency estimate. The numerical results are influenced by modeling assumptions and data selection for issues such as reactor coolant pump seal LOCA, common cause failure probabilities, and operator response to emergency conditions such as small LOCA and station blackout. The sensitivity studies explored the impact of alternate theories and data on these issues.

32988 (NUREG/CR—4551-Vol.2) **Evaluation of severe accident risks and the potential for risk reduction: Sequoyah Power Station, Unit 1.** Benjamin, A.S.; Kunsman, D.M.; Lewis, S.R.; Murfin, W.B.; Williams, D.C. (Sandia National Labs., Albuquerque, NM (USA); Nuclear Regulatory Commission, Washington, DC (USA). Div. of Reactor Systems Safety). Feb 1987. Contract AC04-76DP00789. 518p. (SAND—86-1309-Vol.2). NTIS, PC A22/MF A01 - GPO. File Number TI87010289.

The Severe Accident Risk Reduction Program (SARRP) has completed a rebaselining of the risks to the public from a particular pressurized water reactor with an ice-condenser containment (Sequoyah, Unit 1). Emphasis was placed on determining the magnitude and character of the uncertainties, rather than focusing on a point estimate. The risk-reduction potential of a set of proposed safety option backfits was also studied, and their costs and benefits were also evaluated. It was found that the risks from internal events are generally comparable to those evaluated in the Reactor Safety Study for a different pressurized water reactor, although the calculated uncertainty bands indicate that pressurized water reactor, although the calculated uncertainty bands indicate that the risk could be either higher or lower by as much as an order of magnitude. Principal sources of uncertainty include the modeling of common-cause failure in the component cooling water system, the characteristics of hydrogen generation and burning, and the possi-

bility of fission product releases that bypass the ice condenser. Most of the postulated safety options do not appear to be cost effective for the Sequoyah Plant; however, certain relatively inexpensive hardware and procedural changes to prevent core damage appear to be marginally cost effective. It should be noted that this work is based on a draft report of the ASEP study of core-damage frequency for Sequoyah.

32989 **(NUREG/CR—4719) Coolability of stratified UO_2 debris in sodium with downward heat removal: The D13 experiment.** Ottinger, C.A.; Mitchell, G.W.; Reed, A.W.; Meister, H. (Sandia National Labs., Albuquerque, NM (USA); Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Research). Mar 1987. Contract AC04-76DP00789. 65p. (SAND—86-1043). NTIS, PC A04/MF A01 - GPO. File Number TI87010031.

The LMFBR Debris Coolability Program at Sandia National Laboratories investigates the coolability of particle beds that may form following a severe accident involving core disassembly in a nuclear reactor. The D series experiments utilize fission heating of fully enriched UO_2 particles submerged in sodium to realistically simulate decay heating. The D13 experiment is the first in the series to study the effects of bottom cooling of stratified debris, which could be provided in an actual accident condition by structural materials onto which the debris might settle. Additionally, the D13 experiment was designed to achieve maximum temperatures in the debris approaching the melting point of UO_2. The experiment was operated for over 40 hours and investigated downward heat removal at specific powers of 0.22 to 2.58 W/g. Channeled dryout in the debris was achieved at powers from 0.94 to 2.58 W/g. Maximum temperatures approaching 2700°C were attained. Bottom heat removal was up to 750 kW/m^2 as compared to 450 kW/m^2 in the D10 experiment.

32990 **(NUREG/CR—4762) Shutdown Decay Heat Removal analysis of a Westinghouse 3-loop pressurized water reactor: Case study.** Sanders, G.A.; Ericson, D.M. Jr.; Cramond, W.R. (Sandia National Labs., Albuquerque, NM (USA); Nuclear Regulatory Commission, Washington, DC (USA). Div. of Safety Review and Oversight). Mar 1987. Contract AC04-76DP00789. 815p. (SAND—86-2377). NTIS, PC A99/MF A01 - GPO. File Number TI87007080.

This is one of six case studies for USI A-45 Decay Heat Removal (DHR) Requirements. The purpose of this study is to identify any potential vulnerabilities in the DHR systems of a typical Westinghouse 3-loop PWR, to suggest possible modifications to improve the DHR capability, and to assess the value and impact of the most promising alternatives to the existing DHR systems. The systems analysis considered small LOCAs and transient internal initiating events, and seismic, fire, extreme wind, internal and external flood, and lightning external events. A full-scale systems analysis was performed with detailed fault trees and event trees including support system dependencies. The system analysis results were extrapolated into release categories using applicable past PRA phenomenological results and improved containment failure mode probabilities. Public consequences were estimated using site specific CRAC2 calculations. The Value-Impact (VI) analysis of possible alternatives considered both onsite and offsite impacts arriving at several risk measures such as averted population dose out to a 50-mile radius and dollars per person rem averted. Uncertainties in the VI analysis are discussed and the issues of feed and bleed and secondary blowdown are analyzed.

32991 **(NUREG/CR—4769) Risk evaluations of aging phenomena: The linear aging reliability model and its extensions.** Vesely, W.E. (EG and G Idaho, Inc., Idaho Falls (USA)). Apr 1987. Contract AC07-76ID01570. 66p. (EGG—2476). NTIS, PC E08/MF 5.95 - GPO. File Number TI87008901.

Includes 2 sheets of 24X reduction microfiche.

A model for light water reactor safety system component failure rates due to aging mechanisms has been developed from basic phenomenological considerations. In the treatment, the occurrences of deterioration are modeled as following a Poisson process. The severity of damage is allowed to have any distribution, however, the damage is assumed to accumulate independently. Finally, the failure rate is modeled as being proportional to the accumulated damage. Using this treatment, the linear aging failure rate model is obtained. The applicability of the linear aging model to various mechanisms is discussed. The model is also extended to cover nonlinear and dependent aging phenomena. The implementation of the linear aging model is demonstrated by applying it to the aging data collected in the US Nuclear Regulatory Commission's Nuclear Plant Aging Research program.

32992 **(NUREG/CR—4821) Reactor coolant pump shaft seal stability during station blackout.** Rhodes, D.B.; Hill, R.C.; Wensel, R.G. (EG and G Idaho, Inc., Idaho Falls (USA); Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Regulatory Research). May 1987. Contract AC07-76ID01570. 57p. (EGG—2492; AECL—9342). NTIS, PC A04/MF A01 - GPO. File Number TI87010214.

Results are presented from an investigation into the behavior of Reactor Coolant Pump shaft seals during a potential station blackout (loss of all ac power) at a nuclear power plant. The investigation assumes loss of cooling to the seals and focuses on the effect of high temperature on polymer seals located in the shaft seal assemblies, and the identification of parameters having the most influence on overall hydraulic seal performance. Predicted seal failure thresholds are presented for a range of station blackout conditions and shaft seal geometries.

32993 **(NUREG/CR—4890) Heat of reaction of molten zirconium with UO_2.** Brimhall, J.L.; Prater, J.T. (Pacific Northwest Lab., Richland, WA (USA); Nuclear Regulatory Commission, Washington, DC (USA). Div. of Reactor Accident Analysis). Apr 1987. Contract AC06-76RL01830. 28p. (PNL—6165). NTIS, PC A03/MF A01 - GPO. File Number TI87008601.

The heat of reaction for the dissolution of UO_2 by molten zirconium has been measured at 1980°C using differential thermal analysis. The dissolution of 25 wt % UO_2 by zirconium was determined to be an exothermic reaction with a heat release of approximately 20 kcal/mol UO_2. Experimental difficulties encountered at these high temperatures precluded a precise determination of the heat of reaction.

32994 **(NUREG/CR—4894) A User's Guide to the NRC's Piping Fracture Mechanics Data Base (PIFRAC).** Hiser, A.L.; Callahan, G.M. (Materials Engineering Associates, Inc., Lanham, MD (USA); Nuclear Regulatory Commission, Washington, DC (USA). Div. of Engineering). May 1987. 50p. (MEA—2210). NTIS, PC A03/MF A01 - GPO. File Number TI87900692.

This Guide is the reference for use of the NRC's Piping Fracture Mechanics Data Base (PIFRAC), a computerized data base containing the material's property data for steels used in nuclear power plant piping. These data are for use by NRC regulators and others as required for structural integrity assessments of safety margins in nuclear piping. The data of primary utility in such assessments are fracture toughness (principally J-R curve) and tensile (stress-strain) data, but other characteristic data such as chemical composition and Charpy-V data are also provided where available.

32995 **(OEFZS—4384) Archaeology of computer codes - illustrated on the basis of the code SABINE.** Sdouz, G. (Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H.). Feb 1987. 22p. (In German). (RS—287/87). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702401.

Computer codes used by the physics group of the Institute for Reactor Safety are stored on back-up-tapes. However during the last years both the computer and the system have been changed. For new tasks these programmes have to be available. A new procedure is necessary to find and to activate a stored programme. This procedure is illustrated on the basis of the code SABINE.

32996 **(RHO-RE-EV—95-P) Lessons learned from hydrogen generation and burning during the TMI-2 event.** Henrie, J.O.; Postma, A.K. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Mar 1987. Contract AC06-77RL01030. 105p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE87009438.

This document summarizes what has been learned from generation of hydrogen in the reactor core and the hydrogen burn that occurred in the containment building of the Three Mile Island Unit No. 2 (TMI-2) nuclear power plant on March 28, 1979. During the TMI-2 loss-of-coolant accident (LOCA), a large quantity of hydrogen was generated by a zirconium-water reaction. The hydrogen burn that occurred 9 h and 50 min after the initiation of the TMI-2 accident went essentially unnoticed for the first few days. Even though the burn increased the containment gas temperature and pressure to 1200°F (650°C) and 29 lb/in² (200 kPa) gage, there was no serious threat to the containment building. The processes, rates, and quantities of hydrogen gas generated and removed during and following the LOCA are described in this report. In addition, the methods which were used to define the conditions that existed in the containment building before, during, and after the hydrogen burn are described. The results of data evaluations and engineering calculations are presented to show the pressure and temperature histories of the atmosphere in various containment segments during and after the burn. 51 refs.

32997 **(UCRL—92721) Assessment of thermal damage to polymeric materials by hydrogen deflagration in the Three Mile Island Unit 2 Reactor Building.** Alvares, N.J. (Lawrence Livermore National Lab., CA (USA)). May 1985. Contract W-7405-ENG-48. 34p. (CONF-850417—33). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87008487.

From 189. national meeting of the American Chemical Society; Miami, FL, USA (28 Apr 1985).

Thermal damage to susceptible material in accessible regions of the reactor building was distributed in non-uniform patterns. No clear explanation for non-uniformity was found in examined evidence, e.g., burned materials were adjacent to materials that appear similar but were not burned. Because these items were in proximity to vertical openings that extend the height of the reactor building, we assume the unburned materials preferentially absorbed water vapor during periods of high, local steam concentration. Simple hydrogen-fire-exposure tests and heat transfer calculations duplicate the degree of damage found on inspected materials from the containment building. These data support estimated 8% pre-fire hydrogen concentration predictions based on various hydrogen production mechanisms.

32998 **(UCRL—95301) Nuclear safety as applied to space power reactor systems.** Cummings, G.E. (Lawrence Livermore National Lab., CA (USA)). 1987. Contract W-7405-ENG-48. 5p. (CONF-870102—22). NTIS, PC A02/MF A01; GPO Dep. File Number DE87008726.

From 4. symposium on space nuclear power systems; Albuquerque, NM, USA (12 Jan 1987).

To develop a strategy for incorporating and demonstrating safety, it is necessary to enumerate the unique aspects of space power reactor systems from a safety standpoint. These features must be differentiated from terrestrial nuclear power plants so that our experience can be applied properly. Some ideas can then be developed on how safe designs can be achieved so that they are safe and perceived to be safe by the public. These ideas include operating only after achieving a stable orbit, developing an inherently safe design, "designing" in safety from the start and managing the system development (design) so that it is perceived safe. These and other ideas are explored further in this paper.

32999 **(ZJE—272) Ensuring the nuclear safety of VVER-440 reactor pressure vessels in Skoda, Concern Enterprise, Plzen.** Hrbek, Z. (Skoda, Plzen (Czechoslovakia). Zavod Vystavba Jadernych Elektraren). 1985. 17p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702413.

Various types of routine inspections are described of reactor pressure vessels with the aim of identifying residual lifetime and overall safety. The inspection programme includes: choice of systems and instruments, type of tests, test frequency, safety criteria, measures to be taken in case of unsatisfactory results, documentation. The criteria are given for periodical inspections and requirements listed for instruments and equipment. The main three groups of tests are: visual inspection and dimension tests, surface inspection and volumetric inspection. Briefly described is some of the equipment used. (M.D.).

33000 **(ZJE—273) Reliability aspects of radiation damage in reactor pressure vessel mterials.** Brumovsky, M. (Skoda, Plzen (Czechoslovakia). Zavod Vystavba Jadernych Elektraren). 1985. 13p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702414.

The service life estimate is a major factor in the evaluation of the operating reliability and safety of a nuclear reactor pressure vessel. The evaluation of the service life of the pressure vessel is based on a comparison of fracture toughness values with stress intensity factors. Notch toughness curves are used for the indirect determination of fracture toughness. The dominant degradation effect is radiation embrittlement. Factors having the greatest effect on the result are the properties of the starting material of the vessel and the impurity content, mainly the Cu and P content. The design life is affected by the evaluation of residual lifetime which is made by periodical nondestructive inspections and using surveillance samples. (M.D.).

33001 **Modern control technology for improved nuclear reactor performance.** Oakes, L.C. (Oak Ridge National Lab.). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* NS-33: No. 6, 1721-1722(Dec 1986).

One of the main complaints leveled at reactor control systems by utility spokesmen is complexity. One only has to look inside a power reactor control room to appreciate this viewpoint. The high reliability and versatility of modern microprocessors makes possible distributed control systems with only performance data and abnormal conditions being relayed to the control room. In a sense, this emulates the human-body control system where routine repetitive actions are handled in an involuntary manner. The significance of expert systems to the nuclear reactor control and safety systems is their ability to capture human and other expertise and make it available, upon demand, and under almost all circumstances. Thus, human problem-solving skills acquired by the learning process over a long period of time can be captured and employed with the reliability inherent in computers. This is especially important in nuclear plants when human operators are burdened by stress and emotional factors that have a dramatic effect on performance level.

33002 **Recent intermediate-scale experiments on fuel-coolant interactions in an open geometry.** Marshall, B.W. Jr.; Berman, M.; Krein, M.S. (Sandia National Labs., Albuquerque, NM). pp II5.1-II5.8 of Proceedings of the international ANS/ENS topical meeting on thermal reactor safety. La Grange Park, IL; American Nuclear Society (1986). (CONF-860204—). Contract AC04-76DP00789.

From International ANS/ENS topical meeting on thermal reactor safety; San Diego, CA, USA (2 Feb 1986).

This paper presents the observations and qualitative results from three series of scoping experiments that have addressed various aspects of fuel-coolant interactions. At the outset, the objective pf the CM series was to investigate the coarse-mixing behavior of FCIs. The rapid surface interactions observed during this series, however, prevented much of the melt from entering and mixing with the water. Therefore, experimental observations of the coarse-mixing region, which might be used to assist model development, were not obtained. This work has, however, resulted in other experimental observations important to reactor safety. The authors observed that purely oxidic melts (OM series) resulted in violent steam explosions, even in saturated water, while melts with metallic phases present resulted in interactions at or near the water surface. The rapid interactions near the water surface, which occurred during the CM series, inhibited much of the melt from entering the water. In the two tests in which the crucible lid fell with the melt mass, the lid provided a mechanical shield resulting in deeper pene-

tration into the water before the surface interactions occurred, as might be expected.

33003 **An evaluation of the bases for estimating alpha-mode failure probabilities.** Berman, M. (Sandia National Labs., Albuquerque, NM). pp XI7.1-XI7.11 of Proceedings of the international ANS/ENS topical meeting on thermal reactor safety. La Grange Park, IL; American Nuclear Society (1986). (CONF-860204—). Contract AC04-76DP00789.

From International ANS/ENS topical meeting on thermal reactor safety; San Diego, CA, USA (2 Feb 1986).

Much research has been devoted to understanding fuel-coolant interactions (FCIs) that might occur during core-melt accidents in water reactors. One major objective of this research is the evaluation of the probability of containment failure due to an in-vessel steam explosion (alpha-mode failure). Such a failure could conceivably contribute significantly to the risk associated with these accidents. Similarly, demonstrating that such a failure is extremely unlikely could significantly reduce the uncertainty concerning estimates of risk. Every stage leading to a possible alpha-mode failure is credible, and some stages are currently believed by some experts to be highly likely. There are no experiments or models which are capable of demonstrating low probabilities for any of the stages or for the process as a whole.

33004 **A ranking of alternatives for the mitigation and avoidance of sabotage in nuclear power plants.** Andrews, W.B.; Tabatabai, A.S. (Pacific Northwest Lab., Richland, WA 99352). pp XVI5.1-XVI5.8 of Proceedings of the international ANS/ENS topical meeting on thermal reactor safety. La Grange Park, IL; American Nuclear Society (1986). (CONF-860204—). Contract AC06-76RL01830.

From International ANS/ENS topical meeting on thermal reactor safety; San Diego, CA, USA (2 Feb 1986).

Pacific Northwest Laboratory conducted a study to evaluate alternatives to the design and operation of nuclear power plants, emphasizing a reduction of their vulnerability to sabotage. The scope was to use estimates of core melt accident frequency during normal operations and from sabotage/tampering events to rank the alternatives. Core melt frequency for normal operations was estimated using sensitivity analysis of results of probabilistic risk assessments. Core melt frequency for sabotage/tampering was estimated by developing a model based on probabilistic risk analyses, historic data, engineering judgment and safeguards analyses of plant locations where core melt events could be initiated. Results indicate that the most effective alternatives focus on wide areas of the plant, increase safety system redundancy, and reduce reliance on single locations for mitigation of transients. Less effective options focus on specific areas of the plant, reduce reliance on some plant areas for safe shutdown, or focus on less vulnerable targets.

33005 **Results of the ACRR-DFR experiments.** Reil, K.O.; Marshall, A.C.; Gauntt, R.O.; Ostensen, R.W.; Pickard, P.S.; Fryer, C.; Stalker, K.T.; Muramatsu, K. (Sandia National Labs.). pp XIX8.1-XIX8.8 of Proceedings of the international ANS/ENS topical meeting on thermal reactor safety. La Grange Park, IL; American Nuclear Society (1986). (CONF-860204—). Contract AC04-76DP00789.

From International ANS/ENS topical meeting on thermal reactor safety; San Diego, CA, USA (2 Feb 1986).

Results of the ongoing series of in-pile severe fuel damage and relocation experiments, the DFR series, are presented. A complete analysis of the DF-1 and DF-2 experiments, which address the effects of initial clad oxidation state on subsequent severe damage progression, has been completed. The DF-3 experiment investigating the effects of a Cd-In-Ag control rod on the damage process has recently been completed. Yet to be performed is the fourth experiment, DF-4, which includes a BWR control blade structure in a larger rod bundle in order to determine the effects of B/sub 4/C and stainless steel control blade materials on the melt and damage progression.

33006 **Fuel morphology effects on fission product release.** Osetek, D.J.; Hartwell, J.K.; Cronenberg, A.W. (Idaho National Engineering Lab., Idaho Falls, ID 83415). pp IX2.1-IX2.9 of Proceedings of the international ANS/ENS topical meeting on thermal reactor safety. La Grange Park, IL; American Nuclear Society (1986). (CONF-860204—). Contract AC07-76ID01570.

From International ANS/ENS topical meeting on thermal reactor safety; San Diego, CA, USA (2 Feb 1986).

Results are presented at fission product release behavior observed during four severe fuel damage tests on bundles of UO/sub 2/ fuel rods. Transient temperatures up to fuel melting were obtained in the tests and included both rapid and slow cooldown, low and high (36 GWd/t) burnup fuel and the addition of Ag-In-Cd control rods. Release fractions of major fission product species and release rates of noble gas species are reported. Significant differences in release behaviour are discussed between heatup and cooldown periods, low and high burnup fuel and long- and short-lived fission products. Explanations for the observed differences are offered that relate fuel morphology changes to the releases.

33007 **An alternate method of decay-heat removal in a C-E plant following a SBLOCA.** Boyack, B.E. (Energy Div., Los Alamos National Lab.). pp XXIX2.1-XXIX2.8 of Proceedings of the international ANS/ENS topical meeting on thermal reactor safety. La Grange Park, IL; American Nuclear Society (1986). (CONF-860204—).

From International ANS/ENS topical meeting on thermal reactor safety; San Diego, CA, USA (2 Feb 1986).

The use of an atmospheric steam-dump procedure to cool and depressurize a Combustion-Engineering plant. Calvert Cliffs-1. following small-break loss-of-coolant accidents with failure of the high-pressure injection system to operate has been investigated. The procedure was effective in depressurizing the primary to the low-pressure injection system operating pressure and design temperature using water supplies from the safety-grade condensate water storage tank only. The procedure was found to be effective even if additional failures occurred. Specifically, low-pressure injection conditions were attained if only a single atmospheric dump valve was available or if the safety-injection tanks (accumulators) were not available.

33008 **Understanding the TMI-2 accident: An overview.** Hobbins, R.R.; Broughton, J.M.; Allison, C.M. (Idaho National Engineering Lab., EG and G Idaho, Inc., P.O. Box 1625, Idaho Falls, ID 83415). pp XXIII7.1-XXIII7.7 of Proceedings of the international ANS/ENS topical meeting on thermal reactor safety. La Grange Park, IL; American Nuclear Society (1986). (CONF-860204—). Contract AC07-76ID01570.

From International ANS/ENS topical meeting on thermal reactor safety; San Diego, CA, USA (2 Feb 1986).

Evaluation of the TMI-2 accident is confirming and extending understanding of severe accident damage processes and fission product behavior. Current evidence from within the reactor vessel suggests that damage to the core was very severe (temperatures reached as high as 3100K, the fuel melting point) and molten core materials have relocated to the lower plenum, but damage to the upper plenum and to the reactor vessel itself appear to be minimal. Measurements of fission product retention in the upper core debris bed are about as expected for fuel having been to high temperature, except that the retention of ruthenium in this region is suprisingly low. An accident scenario is described that suggests core slumping took place via two distinct mechanisms: a candling of molten core materials and liquefied fuel which partially froze at the water/steam interface near the bottom of the core and a subsequent breaching of the supporting crust and flow of liquid materials into the water-filled lower plenum.

33009 **Transient bowing of core assemblies in advanced liquid-metal fast reactors.** Kamal, S.A.; Orechwa, Y. (Argonne National Lab., IL). *Transactions of the American Nuclear Society;* **52**: 648-649(1986). (CONF-860610—).

From American Nuclear Society annual meeting; Reno, NV, USA (15 Jun 1986).

One of the objectives of advanced liquid-metal reactors (LMRs) is to maximize the inherent safety features of these reactors. At issue are the core reactivity feedbacks, which require detailed analysis and evaluation so as to assure a net negative reactivity insertion during transient events. The bowing of core assemblies is one of the critical core design elements with respect to its effect on the net reactivity during a transient such as a loss of flow (LOF). In the present paper, two alternative core restraint systems for a conceptual design of an LMR are compared based on their bowing reactivity effect during an LOF transient. The first system includes a restraint ring at the level of the top load pads (TLPs) to control the radial displacements of the outer-most row of the assemblies. This system is called a limited-free-bowing restraint system. The second system does not include a restraint ring and thus allows the assemblies to freely flower outward during an LOF transient. This system is called a free-flowering restraint system. Except for the restraint ring difference, the two systems are very similar. The systems provide two supports for the assemblies at the lower grid plates and permit interaction between assemblies at the above core load pads (ACLPs) and the TLPs.

33010 **Effects of rod worth and drop speed on the BWR off-center rod drop accident.** Cokinos, D.M.; Carew, J.F. (Brookhaven National Lab., Upton, NY). *Transactions of the American Nuclear Society;* **52**: 650-651(1986). (CONF-860610—).

From American Nuclear Society annual meeting; Reno, NV, USA (15 Jun 1986).

In recent years, several multidimensional coupled neutronic/thermal-hydraulic calculations of the boiling water reactor (BWR) control rod drop accident (RDA) have been performed. Typically, two-dimensional (r, z) RDA calculations require that the dropped rod be a center rod, as a result of geometric limitations; while in three-dimensional calculations, the dropped rod is generally taken to be the center rod in order to allow a quarter-core representation and limit computer running times. For typical BWR core loadings, however, the center rod is not necessarily the highest worth rod. The purpose of the present study was to determine the effect of increasing the control rod worth and the rod drop speed on the off-center RDA. An increase in either of these parameters results in an increase in peak core power and fuel enthalpy, and the objective of this study is to determine the margin to the fuel damage threshold.

33011 **Safety analyses for HEU and LEU equilibrium cores and HEU-LEU transition core IAEA generic 10 MW reactor.** Matos, J.E.; Freese, K.E. (RERTR Program, Argonne National Lab., Argonne, IL 60439). pp 796-819 of Applications in nuclear data and reactor physics. Cullen, D.E.; Muranaka, R.; Schmidt, J. Philadelphia, PA; World Scientific Pub. Co. (1986). (CONF-860202—).

From Workshop on applications in nuclear data and reactor physics; Miramare, Trieste, Italy (17 Feb 1986).

This appendix provides the results of a study of the key safety parameters and transient behavior of the IAEA generic 10 MW reactor with HEU and LEU fuels. The performance and safety characteristics of equilibrium cores with HEU and LEU fuels are studied first, followed by detailed results for each step of a gradual transition from HEU to LEU fuel.

33012 **The PARET code and the analysis of the SPERT I transients.** Woodruff, W.L. (Argonne National Lab., Argonne, IL). pp 745-764 of Applications in nuclear data and reactor physics. Cullen, D.E.; Muranaka, R.; Schmidt, J. Philadelphia, PA; World Scientific Pub. Co. (1986). (CONF-860202—).

From Workshop on applications in nuclear data and reactor physics; Miramare, Trieste, Italy (17 Feb 1986).

The results of this comparison of the PARET code with the SPERT I cores are generally quite favorable. The agreement with the B-24/32 core is particularly good. This core might be considered a more representative core for research reactors than either the B-12/64 or D-12/25 cores. These results have demonstrated that the voiding model in the code can successfully describe the behaviour of transients with subcooled boiling, and that certain choices of methods and correlations are preferred. It would appear that many steady-state critical heat flux correlations are too conservative for use in the analysis of transients. Finally, the code seems to provide conservative estimates for the peak clad temperature with the more energetic transients, and the limiting reactivity insertion cases (clad melting) can be determined.

33013 **Comparison of safety parameters and transient behavior of a generic 10 MW reactor with HEU and LEU fuels.** Matos, J.E.; Freese, K.E.; Woodruff, W.L. (Argonne National Lab., Argonne, IL). pp 735-744 of Applications in nuclear data and reactor physics. Cullen, D.E.; Muranaka, R.; Schmidt, J. Philadelphia, PA; World Scientific Pub. Co. (1986). (CONF-860202—).

From Workshop on applications in nuclear data and reactor physics; Miramare, Trieste, Italy (17 Feb 1986).

This paper presents the results of a consistent systematic study of the key safety parameters and transient behaviour of equilibrium cores of the IAEA generic 10 MW reactor with the reference HEU fuel element design and with two LEU fuel element designs. The safety parameters include kinetic parameters, reactivity feedback coefficients, control rod worths, power peaking factors, and shutdown margins. Selected transients were studied within three broad categories: loss-of-flow transients, uncontrolled slow reactivity insertions that may occur during reactor startup, and rapid reactivity insertions that may occur due to failure or malfunction of a core component or misoperation of the reactor.

33014 **Reactor physics and safety analysis.** Diamond, D.J. (Brookhaven National Lab., Upton, NY 11973). pp 519-734 of Applications in nuclear data and reactor physics. Cullen, D.E.; Muranaka, R.; Schmidt, J. Philadelphia, PA; World Scientific Pub. Co. (1986). (CONF-860202—).

From Workshop on applications in nuclear data and reactor physics; Miramare, Trieste, Italy (17 Feb 1986).

This chapter discusses applications of reactor physics with an emphasis on static safety analysis; core transient analysis; and generation of parameters for transient analysis. Other topics include full cycle design and core operations support. Also discussed are reactor physics models; the point kinetics model; and power from amplitude function.

25 ENERGY STORAGE

2504 Capacitor Banks

REFER ALSO TO CITATION(S) 32695

33015 **Automated magnet testing facility.** Lancaster, K.T.; Sharpe, A.W. (Sandia National Labs., Albuquerque, NM 87185). pp 179-181 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—). Contract AC04-76DP00789.

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

The automated Magnet Testing Facility (MTF) is a computer controlled, 60 kJ, parallel capacitor bank that was constructed to pulse test solenoidal magnets. Coil sets from different vendors were evaluated on two criteria: uniformity of field and coil reliability. The first criterion, uniformity of field, is evaluated by installing a pair of coils into stainless steel housings and pulse mapping the fields at a low energy level. Forty field-strength samples were easily collected with the one button operation of the MTF. Two thousand high field pulse tests, at a 20 kG level, is the second criterion for magnet acceptance. In a manually operated system a single operator can achieve this goal in six months. In a continuous operating mode, MTF can achieve the same goal in 42 days.

2505 Flywheels

33016 **(CONF-870203—3) Magnetically confined kinetic-energy storage ring using attractive levitation.** Hull, J.R. (Argonne National Lab., IL (USA); Bechtel National, Inc., San Francisco, CA (USA)). 1987. Contract W-31-109-ENG-38. 33p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87006999.

From Institute of Electrical and Electronic Engineers/ Power Engineering Society winter meeting; New Orleans, LA, USA (1 Feb 1987).

A design concept is presented for a magnetically confined kinetic-energy storage ring (MCKESR) using attractive levitation. Key features of the design include passive ring orbital stability by the method of alternating gradients, a continuous ring to minimize major loading fluctuations, and an external dump chamber that preserves the stationary components in case of loss of confinement. The rotating ring acts as a rotor of a synchronous motor/generator, with permanent magnets mounted on the ring interacting with copper coils that are connected to a cycloconverter to provide power I/O. For a MCKESR device capable of providing diurnal load leveling to utilities, material costs appear reasonable.

2509 Batteries

REFER ALSO TO CITATION(S) 33228

33017 **(DOE/ER/45220—T2) Interfacial electrochemical transport in batteries employing solid electrolytes: Annual report and continuation proposal.** Ratner, M.A.; Shriver, D.F. (Northwestern Univ., Chicago, IL (USA)). 1987. Contract FG02-85ER45220. 7p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009831.

This research project involves a multi-disciplinary investigation of ionic transport along and through interfaces, both within a solid electrolyte and at the electrode/electrolyte contact. The aim is to gain mechanistic understanding of the processes which produce overpotentials and limit mobility at these interfaces, and thereby to suggest design steps for improved performance of solid-state batteries.

33018 **Effect of mass transport on the determination of corrosion rates from polarization measurements.** Nagy, Z.; Thomas, D.A. (Argonne National Lab., Materials Science and Technology Div. and Chemical Technology Div., Argonne, IL 60439-4837). *Journal of the Electrochemical Society;* **133**: No. 10, 2013-2017(Oct 1986). Contract W-31-109-ENG-38.

Many methods have been proposed for the determination of the corrosion current density from polarization curves; the two most commonly used ones are the three-point method and the curve-fitting method. The basis of these methods is a polarization equation that was derived for the complete absence of mass-transport effect or considers the cathodic partial reaction to be under complete mass-transport control. The mixed-control case has been much less investigated, even though this case may quite frequently reflect practical situations. A completely generalized polarization equation is proposed that can be used as a basis for curve-fitting data evaluation under any conditions. This equation was used to determine the error caused by the neglect of mass-transport effect in conventional data evaluation.

33019 **Voltammetry of sodium polysulfides at metal electrodes.** Dobson, J.C.; McLarnon, F.R.; Cairns, E.J. (Applied Science Div., Lawrence Berkeley Lab. and Dept. of Chemical Engineering, Univ. of California, Berkeley, CA 94720). *Journal of the Electrochemical Society;* **133**: No. 10, 2069-2076(Oct 1986). Contract AC03-76SF00098.

The interaction of sodium polysulfides and candidate metals for the current collector and cell casing in sodium/sulfur cells at 300° and 350°C is explored using cyclic voltammetry. The metals investigated are chromium and molybdenum, and data for voltammetric sweeps at rates of 10-500 mV/s in Na/sub 2/S/sub 1/ are reported. The results are compared with those of previous experiments conducted at carbon and platinum electrodes, and mechanisms are proposed to explain the data in terms of specific melt-metal interactions. A model describing the observed cathodic sweep data is presented.

29 ENERGY PLANNING AND POLICY

2901 Energy Analysis And Modeling

REFER ALSO TO CITATION(S) 33036, 33041, 33091, 33099, 33100, 33111, 33112, 33120

2902 Economics And Sociology

REFER ALSO TO CITATION(S) 32607, 32654, 33026, 33035, 33036, 33043, 33091, 33107, 33674, 33684

33020 **(CMI-R—852260-3) Under-estimation of long-term price elasticities of oil demand.** Moxnes, E. (Christian Michelsens Inst. for Vitenskap og Aandsfrihet, Bergen (Norway)). May 1986. 31p. NTIS (US Sales Only), PC A03/MF A01. File Number DE87752129.

In this report a special aspect of energy elasticities is discussed, namely biases in elasticities due to measurement errors and incorrect specifications of demand models. It is shown that it is nearly impossible to estimate long-term price elasticities from short-term time-series. Measurement errors and a too simplistic representation of lags will lead to underestimation of elasticities. A price dependent price elasticity contributes to overestimation. 7 drawings, 5 tables.

2903 Environment, Health, And Safety

REFER ALSO TO CITATION(S) 32607, 32701, 33026, 33654, 33661, 33674, 33684, 33702, 33715, 33722, 33750, 33765

33021 **(AD-A—179024/5/XAB) Disaster analysis: emergency management offices and arrangements. Final report on Phase 1.** Wenger, D.; Quarantelli, E.L.; Dynes, R. (Delaware Univ., Newark (USA). Disaster Research Center). Feb 1987. 163p. NTIS, PC A08/MF A01.

Part I describes and analyzes the research of the Disaster Research Center (DRC) on the responses of local emergency management system in six community disasters. Effectiveness of response was assessed in terms of communication that resulted in correct information collection, a fully functioning EOC, appropriate procurement and distribution of human and material resources, proper task delegation and coordination, a legitimated authority structure, integrated and coordinated relationship with outside private, state, and federal organizations, cooperative relationships with mass media groups, and response activities based upon real, not mythical needs. We examined how extensiveness of response was influenced by prior disaster experiences, prior planning, and federal aid. We then derived an eight-fold categorization of emergency management systems: traditional offices, by-passed agencies, emergent agencies, established agencies, embedded agencies; by-passed community agencies; emergent community agencies; and established community agencies. After a comparative examination of the likelihood of the existence of different types, we point out the policy implications of the findings for response, planning and structure of local emergency management systems. Part II describes the processes and problems in the computerization of the DRC library and data base and projectes DRC's future work.

33022 **(BNL—39591) Environmental effects of radiation emergencies.** Hamilton, L.D. (Brookhaven National Lab., Upton, NY (USA)). Mar 1987. Contract AC02-76CH00016. 20p. (CONF-8611150—2). NTIS, PC A02/MF A01; GPO Dep. File Number DE87010450.

From International conference on non-military radiation emergencies; Washington, DC, USA (19 Nov 1986).

This document described the potential environmental effects of large radioactive releases such as a reactor accident. Tables list information on important fission products and induced radionu-

clides from the Three Mile Island and Chernobyl accidents. The author discussed subsequent radioactivity in air, water, soil, and food chains that lead to man. Radionuclides reach man through one or more of four standard exposure pathways; effective prevention or mitigation of exposure routes depends on timely, accurate reporting of radiation-related information using a common system of units. Examples of the lack of knowledge and poor communication surrounding the Chernobyl accident were described. 6 refs., 1 fig., 6 tabs. (TEM)

33023 **(PB—87-178307/XAB) RCRA (Resource Conservation and Recovery Act) permit quality protocol. Final report.** Bagus, L.J. (Kearney (A.T.), Inc., Chicago, IL (USA)). Aug 1986. 193p. NTIS, PC A09/MF A01.

See also PB—87-178315; Errata sheet inserted.

The document provides a format for evaluating the quality of RCRA permits issued by States or EPA Regions. It is intended for use by technical or non-technical personnel and is designed to assist in detecting omissions and inadequate permit conditions. Effective use of the protocol requires a working knowledge of the RCRA regulations and Agency policy and guidance, along with some familiarity with the format and content of RCRA permits. The protocol does not consider the direct evaluation of technical adequacy, but rather identifes the technical items that must be addressed by the condition and those documents, analyses, etc., that support the condition and must be in the administrative record. This is intended to help the reviewer ascertain whether the condition was properly derived and whether the process followed was properly documented in the record.

33024 **(PB—87-180485/XAB) Creosote and coal tar (nonwood): decision document.** (Environmental Protection Agency, Washington, DC (USA). Office of Pesticide Programs). 2 Oct 1985. 50p. (EPA—540/09-87/130). NTIS, PC A03/MF A01.

The Position Document addresses the risks and benefits of pesticide products containing the subject active ingredient. The Agency has determined that the use of products containing the subject active ingredient may meet or exceed a risk criterion described in 40 CFR Part 154. Potential hazards will be examined further to determine the nature and extent of the risk, and considering the benefits of the subject active ingredient, whether such risks cause unreasonable adverse effects on the environment.

33025 **(PB—87-181327/XAB) Inorganic arsenicals (nonwood use): Position Document 1.** (Environmental Protection Agency, Washington, DC (USA). Office of Pesticide Programs). 18 Oct 1978. 261p. (EPA—540/09-87/165). NTIS, PC A12/MF A01.

The Position Document addresses the risks and benefits of pesticide products containing the subject active ingredient. The Agency has determined that the use of products containing the subject active ingredient may meet or exceed a risk criterion described in 40 CFR Part 154. Potential hazards will be examined further to determine the nature and extent of the risk, and considering the benefits of the subject active ingredient, whether such risks cause unreasonable adverse effects on the environment.

2904 Natural Resources

REFER ALSO TO CITATION(S) 33757

33026 **(DOE/BP—755) Pacific Northwest Rivers Study assessment guidelines, Idaho.** (Idaho Dept. of Fish and Game, Boise (USA). Program Coordination Bureau). Jun 1987. 40p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87010553.

This document identified assessment guidelines for each river resource category and provides some of the reporting formats used for data collection and presentation. The Rivers Study was designed to produce a consistent and verifiable river resource database. While information has proven useful for a variety of applications, the specific purpose of the project was to identify resource considerations which might affect hydropower development. The objective is to use this information to identify areas where minimal impact can be anticipated and development might be appropriate. The study responds to the expressed need for resource information for the following: Energy supply forecasting - Bonneville Power Administration (BPA) and Northwest Power Planning Council (Council). Protected areas - Council: 1984 Columbia River Basin Fish and Wildlife Program section 1204 (c) (1). Site ranking - Council: Northwest Conservation and Electric Power Plan section 14.2.

33027 **(DOE/BP/11639—3) Water budget managers: 1986 annual report.** Karr, M.; DeHart, M. (Fish Passage Center, Portland, OR (USA)). Dec 1986. Contract AI79-83BP11639. 89p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE87009917.

In addition to management of the Water Budget, the Water Budget Managers and FPC staff developed and directed the Smolt Monitoring and Water Budget Evaluation Programs of Section 304(d) of the Fish and Wildlife Program. The fishery agencies and tribes also authorized the Water Budget Managers to coordinate agency and tribal system operational requests throughout the year, including spill management for fish passage. This report summarizes Water Budget Manager activities in implementing program measures, including 1986 flow conditions, water budget usage and spill management, and the in-season management portion of the 1986 Smolt Monitoring Program including data management.

2905 Research, Development, Demonstration, And Commercialization

REFER ALSO TO CITATION(S) 33081, 33090

33028 **(DOE/BP—61396-1) Research and development yearbook, Fiscal year 1986.** (USDOE Bonneville Power Administration, Portland, OR. Office of Engineering and Construction). Apr 1987. 63p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87010558.

A yearbook of Bonneville's accomplishments and its plans for the future is presented. (PSB)

33029 **(LBL—23255) Advanced materials systems as commercial opportunities.** Gilman, J.J. (Lawrence Berkeley Lab., CA (USA)). Apr 1987. Contract AC03-76SF00098. 19p. (CONF-8704120—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010284.

From Entrepreneurial management: new technology and new market development conference; San Luis Obispo, CA, USA (3 Apr 1987).

This paper shows that commercial opportunities in the materials area lie principally in materials systems, and much less in components made from differentiated individual materials. Examples are given.

2906 Nuclear Energy

REFER ALSO TO CITATION(S) 32542, 32582, 32583, 32814, 32820, 33022, 33136, 33137

33030 (INIS-mf—10907, pp 435-451) **Development of nuclear power with respect to economy, safety and environment.** Komarek, A. 1985. (In Czech). NTIS (US Sales Only), PC A08/MF A01. File Number DE87780126. (CONF-8506352—Pt.2).

From AUTOS '85: conference on automation in engineering; Plzen, Czechoslovakia (18 Jun 1985).

The review deals with the basic task of nuclear power, i.e., the necessity of replacing declining reserves of conventional fossil fuels. Problems of development of the nuclear power industry are discussed. The main trends are summed up of world power industry in the 20th century and economic problems are pointed out limiting the effectiveness of nuclear power and resulting from the high capital costs and small reserves of really low-cost nuclear raw materials. The ecologically adverse consequences of nuclear power development are discusssed, such as the discharge of radioactive wastes from plants in normal operation, the hazards of radioactive

contamination in case of accident, the devastation of nature in case of future extraction of poor uranium ores, the transport of high-level radioactive materials, radioactive emissions from the reprocessing of irradiated fuels, the disposal of high-level radioactive wastes with a very long half-life. Also outlined are the progressive trends which should limit the adverse ecological impact of nuclear power. Briefly reviewed are the specific problems of nuclear power in Czechoslovakia. (A.K.).

33031 **(Juel—2080) International nuclear fuel cycle evaluation (INFCE). An attempt on consensus in international nuclear policy.** Schlupp, C. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Programmgruppe Technik und Gesellschaft; Bonn Univ. (Germany, F.R.)). Jul 1986. 286p. (In German). NTIS (US Sales Only), PC A13/MF A01. File Number DE87751904.

The study describes and analyzes the structures, the procedures and decision making processes of the International Nuclear Fuel Cycle Evaluation (INFCE). INFCE was agreed by the Organizing Conference to be a technical and analytical study and not a negotiation. The results were to be transmitted to governments for their consideration in developing their nuclear energy policies and in international discussions concerning nuclear energy cooperation and related controls and safeguards. Thus INFCE provided a unique example for decision making by consensus in the nuclear world. It was carried through under mutual respect for each country's choices and decisions, without jeopardizing their respective fuel cycle policies or international co-operation agreements and contracts for the peaceful use of nuclear energy, provided that agreed safeguards are applied.

33032 **(NUREG—0750-Vol.24-No.4) Nuclear Regulatory Commission Issuances, October 1986.** (Nuclear Regulatory Commission, Washington, DC (USA). Div. of Technical Information and Document Control). Oct 1986. 199p. NTIS, PC A09/MF A01 - GPO. File Number TI87900639.

This report includes the issuances received during the specified period from the Commission (CLI), the Atomic Safety and Licensing Appeal Boards (ALAB), the Atomic Safety and Licensing Boards (LBP), the Administrative Law Judge (ALJ), the Directors' Decisions (DD), and the Denials of Petitions for Rulemaking (DPRM).

2910 Conservation

REFER ALSO TO CITATION(S) 33042, 33043, 33050, 33081, 33088, 33089, 33091, 33100, 33107, 33112, 33124, 33125, 33126

33033 **(DOE/CE/64861—T1) Positive cash flow financing in the institutional sector: Final report.** (Hansen Associates, Inc., Annapolis, MD (USA)). 1986. Contract FG01-85CE64861. 135p. NTIS, PC A07/MF A01; 1; GPO Dep. File Number DE87010222.

The economics of energy management has prompted a surge of private investment in institutional energy conservation efforts. Purpose of the Positive Cash Flow Financing in the Institutional sector project is to establish some management criteria for internal assessment of relevant conditions for energy financing and to aid institutional administrators in selecting the best financial options available. The project's research design included the selection of three sites and an assessment of energy efficiency financing conditions in three institutions at each site and at the state level. The analysis examined the financial and governance structure, energy cost and consumption, replication potential, opportunities for alternative financing, and the potential for a community-wide cooperative effort. Morgantown, West Virginia, was selected as the primary research site and the developmental work was conducted at West Virginia University (WVU). The City of Morgantown and the Monongalia County Board of Education served as sites to assess the replication potential. The verification sites were Dearborn, Michigan, and San Angelo, Texas, where the local governments, school systems, a college, and a hospital were studied.

33034 **(TVA/OP/CEM—87/44) Energy Management annual report: Fiscal Year, 1986.** Brothers, S.L. Jr. (Tennessee Valley Authority, Chattanooga (USA). Div. of Conservation and Energy Management). Feb 1987. 94p. NTIS, PC A05/MF A01. File Number DE87900683.

This report is submitted to satisfy annual reporting requirements of the Federal Energy Management Program (FEMP) for FY 1986. It discusses the Tennessee Valley Authority (TVA) energy management efforts in the area of buildings and general operations, as required by the FEMP, as well as TVA's self-initiated efforts in related areas.

33035 **The integral role of conservation program evaluation in the Bonneville Power Administration.** Keating, K.M. (Bonneville Power Administration). pp K45-K56 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

Too often program evaluation is added as an afterthought in conservation programs. In such cases the opportunity to prepare for important evaluation needs is lost during the design of the program. In addition, the resources and attention devoted to the program evaluation reflect the importance and usefulness evaluation holds within the organization. Since the establishment of the evaluation function in Bonneville Power Administration's (BPA) Office of Conservation, the design of all programs and pilots includes evaluation from the earliest stages. Required early consideration provides the opportunity for a methodologically sound evaluation design. It is also constructive for program designers, because it helps assure them that the questions they seek to answer can be addressed with the pilot. This paper explains the high priority and extensive resources given to program evaluation in BPA by detailing the roles that evaluation plays in the organization. Among these roles are: measuring savings, measuring the levelized costs of the savings, providing input to the supply curve, providing input to the load forecast, influencing program design, and recommending modifications to ongoing programs.

33036 **Conservation resource planning - A tool for linking utility conservation programs, load forecasting, and resource acquisitions.** Gordon, F.M. (Bonneville Power Administration). pp K30-K44 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

The Bonneville Power Administration (BPA) has developed a corporate planning and modeling system for selecting the least-cost mix of conservation and generating resources to meet the long-range need for electric power in the Pacific Northwest. This paper briefly reviews the overall modeling system, and then discusses in some detail the planning process and program mix model used to translate the conservation resource acquisition targets that come from the corporate models into 2-year budgets and 20-year plans for acquisition of conservation from specific programs. The overall corporate modeling system and the conservation planning process feature an explicit method for handling uncertainty about future load growth, and, hence, about the need for resources to meet load. The planning system also provides for a careful integration of the knowledge and experience of conservation experts and program managers within and outside of BPA with the powerful analytic capabilities of computer models.

2920 Supply, Demand, And Forecasting

REFER ALSO TO CITATION(S) 32492, 32499, 33036, 33042

33037 (DOE/EIA—0384(86)) Annual Energy Review, 1986. (USDOE Energy Information Administration, Washington, DC. Office of Energy Markets and End Use). 8 May 1987. 294p. NTIS, PC A13/MF A01 - GPO; 1; GPO Dep. File Number DE87009421.

Energy markets projections through the next 10 years are given. These projections are judgments on an anticipated occurrences and trends in the future and incorporate historical trends and assumptions about key variables. The report addresses key issues for each of the major energy markets such as petroleum, natural gas, coal, and electricity, and discusses anticipated developments for end-use energy consumption and new technologies. Highlights in the report show that, despite the decline in energy prices during 1986, the long-term trends remain essentially unchanged from the Energy Information Administration's 1985 view. It is assumed that the economy will maintain an average growth of 2.5% per year through 2000 and real world oil prices, in 1986 dollars, remain below $20 per barrel until 1992; by the year 2000, increasing world oil demand will raise oil prices to $33 as the current excess of oil supply is absorbed.

33038 (DOE/PC/91272—T5) Modeling the impacts of changing coal technology and policy: Final report, March 1, 1986-February 28, 1987. Arey, D.; Dziegielewski, B.; Crenshaw, J.; Parker, G.; Drylis, I. (Southern Illinois Univ., Carbondale (USA). Coal Extraction and Utilization Research Center). May 1987. Contract FC22-86PC91272. 63p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87009871.

The Coal Technology Laboratory/Coal Supply and Transportation Model (CRL>CSTM) is a mathematical simulation model which will forecast the regional production and consumption of coal in the US and its exports sector. During this reporting period, CTL/CSTM was updated and modified to include new data on coal switching and coal preparation. Four scenarios of possible future changes in SO_2 emission regulation were examined. Results are comprised of a forecast of coal production and consumption and SO_2 emissions for 1995. Results of the base-case run of the model for 1985 were compared to actual statistics of coal production, utility coal consumption, and SO_2 emissions. The model provides a satisfactory replication of actual data at the regional level. A survey of utilities was conducted to determine preferences for adopting various alternative technologies for reduction of SO_2 emissions. Conclusions are drawn concerning the possible future pattern of coal production in the US, the methods for achieving SO_2 emission reductions, the costs of adopting various methods, and the economic sectors in which the expenditures for emission reduction would accrue.

33039 (EPRI-EM—5217) Customer preference and behavior: Residential modeling framework: Final report. (Booz, Allen and Hamilton, Inc., Bethesda, MD (USA); Electric Power Research Inst., Palo Alto, CA (USA)). May 1987. 353p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920388.

This report presents a technical description of the Customer Preference and Behavior Project and the models developed to predict customer acceptance. The project team began by exploring the marketing problems facing the DSM planner: diverse customer populations; the need to predict customer acceptance for a variety of program designs by target market; and, the need for cost-effective promotion and advertising approaches. In response to these problems, the team developed a theoretical modeling framework that can predict customer acceptance of almost any DSM program configuration. The project team reviewed consumer choice theory, the data requirements for using the models, and the technical issues and problems that might occur when applying the models. While the report serves as a technical description of the Customer Preference and Behavior Project, it also can assist those just beginning to address DSM problems and those wishing to go beyond direct application of the model and data bases. 276 refs., 39 figs.

33040 (NZERDC-P—115) Indirect energy of New Zealand's foreign trade, 1969-1978: An energy analysis of imports and exports. Baines, J.T.; Peet, N.J.; Currier, E.A. (Canterbury Univ., Christchurch (New Zealand). Dept. of Chemical and Process Engineering). Jan 1987. 59p. NTIS, PC A04/MF A01. File Number DE87900819.

The principal object of this analysis has been to describe New Zealand's international transactions in indirect energy, paying particular attention to detail in the area of merchandise trade. The report describes the method of evaluating merchandise trade in energy terms. A summary of the overall trends and the major constituents is given. An attempt has also been made to present this foreign exchange in indirect energy in the context of New Zealand's pattern of total energy consumption. The growth in imports of direct energy was restrained more effectively than that of indirect energy (increases of 10% and 40% respectively). By the end of the survey period, imports of indirect energy were entering the country at almost the same level as imports of oil (164 PJ and 179 PJ respectively for 1975-1978). The greater emphasis on manufactured exports has resulted in an increase in the imported component of New Zealand exports - 16-9% in 1969-72 to 18.3% in 1987-78. The rate at which New Zealand exported the imported energy of merchandise rose more rapidly (+41%) than the overall rate of New Zealand's export growth (+29%).

2930 Policy, Legislation, And Regulation

REFER ALSO TO CITATION(S) 32700, 32701, 33035, 33036, 33040, 33088, 33089, 33091, 33099, 33107

33041 Residential energy use in the OECD: 1970-1982, the bottom-up approach. Schipper, L. (Energy and Environment Div., Lawrence Berkeley Lab., Berkeley, CA 94720). pp J305-J320 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—). Contract AC03-76SF00098.

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

When the scattered information collected was consistently assembled, it revealed surprisingly large reductions in energy use per dwelling in most countries during the 1973-1982 period, with drops of up to 35% in some cases. The detailed analysis suggests that these reductions are primarily due to changes in occupant behavior and investments in low-cost projects, motivated more by the rise in energy prices than by government policies. The observed variations among countries and the analysis of the critical determinants of energy use imply that an exchange of information would be very useful for energy planners and policy-makers. This paper summarizes the method and findings, and discusses the changes in energy use that have taken place over the past decade.

33042 Improving energy resources management in India: Approaches and issues. Kozloff, K. (Minnesota Dept. of Energy and Economic Development). pp J69-J83 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

Recent energy supply and demand trends in India are having adverse economic and environmental consequences. Demand for petroleum products drains export earnings to pay for imported oil. Indigenous coal and petroleum development and electrification are very capital intensive. Overuse of indigenous noncommercial fuels, primarily firewood and animal dung, has resulted in deforestation, soil erosion, loss of soil fertility, and increased human labor for fuel collection. While the need to increase indigenous commercial energy supplies has long been recognized, recent national plans also call for improving energy management and efficiency. Despite low per capita consumption, substantial opportunities exist for cost effectively increasing the efficiency in the use of both fossil and renewable fuels in all sectors. A large number of programs have been

implemented by public and private organizations to realize potential energy efficiency improvements.

33043 **The emerging role of the public sector in third-party finance.** Weedall, M. (Bonneville Power Administration). pp L113-L126 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

Third-party financing of energy projects has enjoyed tremendous growth in the institutional building sector because of several conditions. These include lack of up-front capital, increasingly tight budgets, and typically an older building stock that can yield significant energy savings. This paper explores what activities that local, State, and Federal levels of government are likely to undertake over the next 5-10 years in third-party finance of energy projects. Three roles are identified for a governmental entity. These are as a market, a promoter and regulator of third-party services. To date, all levels of government have assumed some activity in each of these activities. For local governments the prime focus has been as a market for third-party arrangements. At the State level, significant activity has occurred as a market, promoter, and regulator. Finally, Federal activity has largely been as a regulator through the mechanism of the tax structure.

2940 Fossil Fuels

REFER ALSO TO CITATION(S) 32474, 32476, 32492, 32493, 32494, 32499, 33020

2950 Hydrogen And Synthetic Fuels

REFER ALSO TO CITATION(S) 32606

2960 Electric Power

REFER ALSO TO CITATION(S) 32616

33044 **(DOE/BP—705) Bonneville Power Administration budget for fiscal year 1988.** (USDOE Bonneville Power Administration, Portland, OR). Jan 1987. 54p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87010353.

The budgets cover energy conservation, system planning and construction, capital equipment, fish and wildlife, etc. (DLC)

33045 **(DOE/BP—798) Division of Residential Programs: 1987 program and project summary.** (USDOE Bonneville Power Administration, Portland, OR. Div. of Residential Programs). May 1987. 41p. NTIS, PC A03. File Number DE87010554.

This booklet tells of the variety and scope of the Bonneville Power Administration's conservation programs in the Residential Sector. The booklet begins with a brief background section on the Bonneville Power Administration (Bonneville) and its conservation mission and organizational responsibilities. The main section covers the Division's programs in residential weatherization, energy-efficient new home construction, energy-efficient appliances, assistance to State and local governments, and energy education. A number of activities are noted that feature marketing as a key component. Lists are also included of utility, State, and local governments and other organizations that sponsor the programs locally.

33046 **(DOE/BP—807) Final workplans: In response to the Northwest Power Planning Council's 1986 power plan.** (USDOE Bonneville Power Administration, Portland, OR). Mar 1987. 215p. NTIS, PC A10/MF A01; 1; GPO Dep. File Number DE87009933.

The Workplans are numbered to correspond to the activities in the Action Plan of the Council's 1986 Power Plan. Five of the Workplans (1 through 5) deal with conservation activities that Bonneville will undertake. Workplan 6 covers Bonneville's plans to coordinate the regional planning effort with State and local governments. Workplans 7 through 9 outline Bonneville's development of a comprehensive process and its supporting activities for the acquisition of power-generating and conservation resources. (The Council's Power Plan Action Item 10 deals with Bonneville's Intertie Access Policy, but the Council did not request a Workplan on that policy development.) Workplan 11 shows Bonneville's plans to improve its data bases and analytical methods. Within each Activity Plan, background information is followed by a description of tasks Bonneville expects to accomplish. Start and finish dates are provided for specific tasks, or a single date is listed for one-time events. The final section shows level of effort, usually in terms of budget and FTE Bonneville staff devoted to each Activity Plan. The Table of Contents serves as a cross-reference index to show how Bonneville's Activity Plans correspond to specific Council Action Items.

33047 **(DOE/EIA—0226(87/01)) Electric power monthly, January 1987.** (USDOE Energy Information Administration, Washington, DC. Office of Coal, Nuclear, Electric and Alternate Fuels). 16 Apr 1987. 46p. NTIS, PC A03/MF A01 - GPO; 1; GPO Dep. File Number DE87008982.

Net generation from nuclear-powered units reached a record high of 39,975 gigawatthours in January 1987, over 500 gigawatthours more than the previous 1-month record for nuclear-powered net generation, which occurred in December 1986. Net generation from nuclear energy in January 1987 represented 17.9% of the total electricity produced that month. Total net generation from nuclear units was 10% higher in January 1987 compared with January 1986. In January 1987, net generation from hydroelectric units had an even higher percent difference than net generation from nuclear-fired units when compared with the January 1986 level. Hydroelectric net generation was 25,409 gigawatthours, 19% higher in January 1987 than January 1986. Hydroelectric net generation reported by electric utilities in January 1986 was 17% lower than the average of January data for 1976 through 1985. In January 1987, net generation from hydroelectric units was only 1% below the historical 10-year average of January data. Both nuclear-powered and hydroelectric units helped meet customer demand in January 1987, when total net generation was 222,736 gigawatthours, over 2% above the January 1986 level. This higher level of total net generation was partially due to colder temperatures (by 5%) in January 1987 compared with 1 year earlier, however, temperatures in January 1987 were warmer than normal (by 4%).

33048 **(DOE/EIA—0397(86/4Q)) Electric power quarterly, October-December 1986.** (USDOE Energy Information Administration, Washington, DC. Office of Coal, Nuclear, Electric and Alternate Fuels). 8 Apr 1987. 349p. NTIS, PC A15/MF A01 - GPO; 1; GPO Dep. File Number DE87008981.

In this report, data collected on Form EIA-759 regarding electric utilities' net generation, fuel consumption, and fuel stocks are presented on a plant-by-plant basis. In addition, quantity, cost, and quality of fossil fuel receipts collected on the Federal Energy Regulatory Commission (FERC) Form 423 are presented on a plant-by-plant basis. The report also presents a quarterly summary of disturbances and unusual occurrences affecting the electric power industry collected by the Office of International Affairs and Energy Emergencies (IE) on the Form IE-417.

33049 **(PB—87-177168/XAB) Study of commercial electric-demand charges for 28 US locations. Topical report.** Fay, J.M.; Schoening, N.C. (Alabama Univ., Huntsville (USA). Center for High Technology Management and Economic Research). Dec 1986. 74p. (UAH-RR—473). NTIS, PC A04/MF A01.

Typical annual electric bills for 1985 are calculated and the importance of demand charges are determined using simulated load data for seven different commercial building types in 28 different U.S. locations. The importance of ratchet clauses, minimums, maximums and contract clauses are also evaluated. The characteristics of commercial demand charges also are summarized for the 28-utility sample.

2980 Consumption And Utilization

REFER ALSO TO CITATION(S) 33037, 33041, 33081, 33099, 33112, 33120

33050 (NZERDC-P—99) Liquid fuel demand in New Zealand agriculture. McChesney, I.G. (Joint Centre for Environmental Sciences, Christchurch (New Zealand); New Zealand Energy Research and Development Committee, Auckland). Dec 1985. 205p. NTIS (US Sales Only), PC A10/MF A01. File Number DE87900743.

This report has two main objectives, to identify the determinants of liquid fuel demand; and to provide a detailed data base on current liquid fuel consumption patterns. During 1978/79, 17% of the diesel and 9% of the petrol used in New Zealand was used by farmers and the farm servicing sector. Two-thirds of the fuel was used for transportation. Production type, technology and activity demand are identified as primary determinants of fuel demand. Detailed fuel use analysis of each of these determinants is outlined in the Appendices.

33051 (NZERDC-P—103) Estimation of energy consumption in the New Zealand commercial buildings sector. Baird, G.; Newsam, G. (Victoria Univ., Wellington (New Zealand). School of Architecture; New Zealand Energy Research and Development Committee, Auckland). Mar 1986. 152p. NTIS (US Sales Only), PC A08/MF A01. File Number DE87900742.

This report summarizes the results of Task No. 1 of the NZERDC Contract 3291 "Opportunities for More Efficient Use of Energy in Commercial Buildings." Task No. 1 was concerned with the "Estimation of the Energy Consumption in the New Zealand Commercial Building Sector." The report that follows gives a record of the work done, describes the progress made, and presents the results on the analyses that have been completed. It is designed to serve as a reference for those working on future tasks related to the contract.

2990 Unconventional Sources And Power Generation

REFER ALSO TO CITATION(S) 32654, 33089, 33090, 33112, 33120

30 DIRECT ENERGY CONVERSION

3001 Mhd Generators

33052 (DOE/ET/10815—119) [Operation of a MHD coal fired flow facility]: Quarterly technical progress report, January-March 1987. (Tennessee Univ., Tullahoma (USA). Space Inst.). May 1987. Contract AC02-79ET10815. 22p. (UTSI—87-04). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010032.

In this quarterly progress report, UTSI reports on progress in developing the technology for the steam bottoming cycle components for the MHD steam combined cycle power plant. No testing was scheduled this quarter in the Coal Fired Flow Facility and activities reported include modifications and upgrade of the flow train and facility systems to prepare for long term testing scheduled for later this fiscal year. Design of the new circular aerodynamic duct which simulated the MHD topping cycle for downstream is discussed. Other facility modifications deemed necessary to achieve the reliability required for long term testing are discussed. Activities necessary to test candidate tube materials at the temperatures specified by the Downstream Integration Panel in all three superheater test module tube bundles and the installation of the new, larger boiler to provide the steam required to cool them are covered. In addition, brief summaries of analysis of test data from the LMF4-I test conducted last year are included in tube metal corrosion, particulate clean-up and diagnostics. More detailed reports of data analysis are contained in test reports and topical reports on specific technical areas. 1 fig., 1 tab.

33053 Hybrid O-D, 1-D, and 2-D model of helical explosive generator. Burgess, T.J. (Pulsed Power Theory Div., Sandia National Labs., Albuquerque, NM 87185). pp 223-226 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—).

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

The authors describe a hybrid code model of the Sandia National Laboratories' model 642, a very large explosive-driven magnetic flux compression generator. This involves the use of two codes. The first is a coupled O-D equivalent circuit model and 1-D magneto-hydrodynamic computation. The second is the 2-D materials response code, CSQ. This is used to obtain an equivalent "drag coefficient" so that the 2-D stator coil conductor-encapsulant interaction can be modeled in the 1-D code.

3005 Fuel Cells

33054 (DOE/ER/45247—1) Surface chemistry of electrocatalysts: Annual report, July 1, 1986 through June 30, 1987. Hubbard, A.T. (Cincinnati Univ., OH (USA). Dept. of Chemistry). 1987. Contract FG02-86ER45247. 6p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010481.

A new methodology for investigation of adsorbed ions and molecules in the electrocatalytic processes upon which fuel cells depend is based upon electron energy-loss, and inelastic scattering of low-energy loss spectroscopy (EELS) with electrochemical surface pretreatment to obtain the vibrational spectra of a family of sulfur-organic compounds related to thiophenol. EELS spectra prove to be a remarkably clear indicator of the identity of an adsorbed molecule, fragment or functional group of an electrode surface. Typical electroactive adsorbates are unaffected by evacuation and thus readily studied. Elastic scattering of low-energy electrons proves to be a source of highly precise packing-density data from which to deduce adsorbate molecular orientation and mode of bonding to the surface. EELS and elastic scattering data were obtained for a family sulfur-organic compounds related to thiophenol. Objectives of current and future work include: identification of organic species at electrode surfaces; determination of the modes of surface attachment; comparison of adsorption strengths of common functional groups; and measurement of the reaction rates and reaction pathways of specific adsorbed molecular species.

33055 Phase relationships in the Cr-Li-K-C-O system at 650°C. Hsu, H.S.; De Van, J.H. (Oak Ridge National Lab., Oak Ridge, TN). *Journal of the Electrochemical Society;* 133: No. 10, 2077-2080(Oct 1986). Contract AC05-84OR21400.

The reaction of chromium with Li/sub 2/CO/sub 3-/K/sub 2/CO/sub 3/ melts was investigated from a thermodynamic point of view. Thermochemical calculations with the SOLGASMIX-PV computer program were used to establish equilibrium phase relationships for the Cr-Li-K-C-O system at 650°C. The calculated phase relationships were checked experimentally by thermogravimetric analysis (TGA) and differential thermal analysis (DTA). The results of TGA and DTA were self-consistent with respect to the reaction products predicted from the calculated phase stability diagrams. Finally, the phase stability diagrams of the Cr-Li-K-C-O system were used as an aid in understanding the corrosion processes of chromium in molten carbonate salt under both fuel gas and oxidizing gas used in molten carbonate fuel cells.

32 ENERGY CONSERVATION, CONSUMPTION, AND UTILIZATION

3201 Buildings

REFER ALSO TO CITATION(S) 32659, 32662, 32663, 32663, 32664, 32665, 32666, 33045, 33051, 33219, 33951

33056 **(BNL—52062) Technical assessment of a condensing oil-fired pulse combustion hydronic boiler.** McDonald, R.J.; Nally, J.D. (Brookhaven National Lab., Upton, NY (USA)). Mar 1986. Contract AC02-76CH00016. 41p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87009993.

The objective of this report is to present the results of an engineering analysis of the energy conservation potential associated with a condensing oil-fired pulse combustion hydronic boiler designed for residential space heating applications. A laboratory study was conducted to measure the efficiency performance and operating characteristics of a prototype oil-fired pulse combustion condensing boiler system. The primary goal of the project was to clearly define the potential benefits of using the concept as a replacement for existing oil combustion systems both for existing housing inventories and new housing construction. In this regard the study utilized two techniques of measuring heating system efficiency. The first was the thermal efficiency measurement technique developed by BNL for precise determination of heating efficiency based on enthalpy (heat) flow measurement. The second was the more common flue loss, or stack gas analysis which is an indirect measurement of efficiency. In addition, the CO_2, CO, and NO/sub x/ emissions in the flue products from the system were measured along with limited noise level determinations.

33057 **(CONF-870620—4) Energy measurements of single-family houses with attics containing radiant barriers.** Levins, W.P.; Karnitz, M.A. (Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 30p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87009027.

From American Society of Heating, Refrigerating and Air-Conditioning Engineers meeting; Nashville, TN, USA (28 Jun 1987).

Radiant barriers were tested in attics of three unoccupied research houses which are located near Knoxville, Tennessee. The prime purpose of the testing was to determine the interaction, if any, between two types of radiant barriers, horizontal (barrier laid on top of attic insulation) and truss (barrier attached to underside of roof trusses), and three levels of fiberglass-batt attic insulation, R-11, R-19, and R-30. Testing of radiant barriers with R-19 fiberglass-batt attic insulation was done at the houses in the summer of 1985 and in the winter of 1985-86. The R-11 and R-30 testing was done in the summer of 1986. These results showed that horizontal barriers were more effective than truss barriers in reducing house cooling and heating loads. The summer of 1986 testing showed that increasing the attic insulation from R-11 to R-30 reduced the house cooling load (Btu) by approximately 16%. Adding a horizontal barrier to R-11 also reduced the cooling load compared to R-11 with no barrier by about 16%, while a truss barrier reduced it by 11%. A horizontal barrier with R-30 only reduced the cooling load by 2% compared to R-30 with no barrier, while an increase in the cooling load of 0.7% was measured with a truss barrier and R-30. Radiant barriers were not effective in reducing house cooling loads when R-30 attic insulation was present. The results from the summer of 1985 were integrated into the latest work through the use of a modeling effort using the building load simulation program, DOE-2.1B. This showed that R-19 insulation in conjunction with a horizontal barrier was (for Knoxville) the most effective barrier/insulation combination and could reduce the house cooling load by 25.1% compared to R-11 with no barrier.

33058 **(DOE/BP/13795—15) 1985 Residential Occupant Survey-Telephone.** Darwin, D.F.; Ivey, D.L.; Klan, M.S.; Shankle, S.A.; Mohler, B.L. (Pacific Northwest Lab., Richland, WA (USA)). Jul 1986. Contract AC06-76RL01830;AC79-83BP13795. 132p. NTIS, PC A07/MF A01; 1; GPO Dep. File Number DE87009940.

The purpose of the survey was to collect information from residential occupants related to the use and conservation of electrical energy in Pacific Northwest residences. This report documents the development, implementation, and results of the survey. For most of the residences in the survey, information was collected on the thermal integrity of the residence; the capital stock of electrical equipment and appliances used by the occupants; various energy-use related behaviors such as conservation measures undertaken, the use of wood burning equipment, indoor temperature settings, and day-to-day occupancy patterns; the occupants' attitudes about electricity prices; and various demographic indices such as the age, sex, and education of the occupants. For some residences, information also was collected on the age and size of the residence; the space and water heating fuels used in the residence; and the number and income of the occupants.

33059 **(DOE/BP/13795—16) Analysis of thermal performance data taken under the Residential Standards Demonstration Program.** Drost, K.; Zimmerman, P.; Skarda, R.; Pearson, E. (Pacific Northwest Lab., Richland, WA (USA)). Apr 1987. Contract AC79-83BP13795;AC06-76RL01830. 116p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE87009926.

The Bonneville Power Administration (BPA) initiated the Residential Standards Demonstration Program (RSDP) in 1983 to determine the costs and thermal performance improvements associated with increased levels of thermal integrity in new residences as proposed by the Northwest Power Planning Council in the Model Conservation Standards (MCS). The program has resulted in the construction of approximately 500 new residences purportedly built to thermal standards as dictated by the MCS in each of three climate zones in the region. A subset of the residences has been included in the End-Use Load and Conservation Assessment Program (ELCAP) being conducted at the Pacific Northwest Laboratory (PNL). These structures are metered to record hourly energy consumption for a variety of end uses. This report documents an investigation of the thermal performance of RSDP structures using data collected as part of ELCAP.

33060 **(DOE/BP/13795—18) A thermal analysis of homes in Bonneville Power Administration's Residential Standards Demonstration Program: Program results report No. 7.** Meier, A.; Nordman, B.; Conner, C.; Busch, J. (Lawrence Berkeley Lab., CA (USA)). Sep 1986. Contract AC79-83BP13795;AC03-76SF00098. 101p. (LBL—22109). NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE87009930.

This report presents Lawrence Berkeley Laboratory's thermal analysis of the Bonneville Power Administration's Residential Standards Demonstration Program. The analysis sought to determine the energy savings for houses built to the Model Conservation Standards as proposed by the Northwest Power Planning Council. The analysis is based on 232 houses built to the Model Conservation Standards and 292 selected to represent current building practice. The thermal analysis consists of three parts. The "Thermal Pre-Analysis" was undertaken to determine the extent of distortions in thermal performance during the first few months after the construction of the house. In addition, we sought to learn, through simulation, the minimum length of monitoring needed to accurately estimate annual space heating consumption. Second, the "Consumption Analysis" was undertaken to assess differences in energy consumption based on raw triple-meter data, that is, prior to any adjustment for differences in weather, building, or occupant characteristics. Finally, the "SUBMET Analysis" was undertaken to compare the thermal performance of the houses after normalizing the metered space heating energy use to account for differences in floor area, internal gains, inside temperature, and climate.

33061 **(DOE/BP/13842—T1) Report to the Coeur D'Alene Kootenai Nez Perce Shoshone-Bannock and Shoshone-Paiute Tribes on the adoption and enforcement of the model standard for energy conservation in new buildings: Final narrative report, 9/30/83-9/30/84.** Albrecht, J.C. (Coeur d'Alene Tribe, St. Maries, ID (USA)). 1984. Contract FG79-83BP13842. 213p. NTIS, PC A10/MF A01; 1; GPO Dep. File Number DE87008684.

This report is the result of one year of work directed at developing a program for application and enforcement of the Model Standard for Energy conservation in New Buildings proposed by the Northwest Power Planning Council. The work has consisted of analyzing and correcting the published version of the Standard, revising the Washington State Energy Code Training Manual 1983 Edition to make it usable as a training manual for the Model Conservation Standard (MCS), attending many meetings involving analysis and interpretation of the MCS and its implications, and collecting some materials for use by tribal staff members when adoption and application of the MCS is achieved. Unfortunately, not a great deal has come of this effort. The MCS is still under challenge and criticism as to its suitability and applicability, so that a final, legally substantiated version is not yet available, so that the training manual prepared will need another revision when the revised version of the MCS becomes available. Participants at all the attended meetings were as uncertain of the implications and liabilities associated with adoption of the MCS at the end of the year as at the beginning. In consequence of this, really useful materials relating to adoption and enforcement of the MCS are not available. An exercise to introduce heat movement and conservation to the lay public has been developed and may be useful. It has been tested on several people and found successful.

33062 (DOE/CE/27460—T9, pp E.19-E.37) **HVAC and water heating system field test experiences.** Baxter, V.D.; McGraw, B.A. (Oak Ridge National Lab., TN). Aug 1984. American Council for an Energy-Efficient Economy, 1001 Connecticut Ave., NW, Suite 535, Washington, DC 20036. File Number TI87005138.

In Doing better: setting an agenda for the second decade: Volume E. Proceedings from the panel on appliances and equipment.

The TECH complex has been utilized since 1976 as a field test site for several novel and conventional space conditioning and water heating systems. Systems tested include the Annual Cycle Energy System (ACES), solar space heating systems (hydronic and air), parallel and series solar assisted heat pumps, air-type solar heating with off-peak storage, passive solar heating, two conventional air-to-air heat pumps, an air-to-air heat pump with desuperheater water heater, and horizontal coil and multiple shallow vertical coil ground-coupled heat pumps. System descriptions and test results are presented as well as performance observations. 26 references, 12 figures, 11 tables.

33063 (DOE/CE/27460—T9, pp E.198-E.213) **Assessment of the energy saving potential of nonazeotropic refrigerant mixtures.** Levins, W.P. (Oak Ridge National Lab., TN). Aug 1984. American Council for an Energy-Efficient Economy, 1001 Connecticut Ave., NW, Suite 535, Washington, DC 20036. File Number TI87005138. Contract AC05-84OR21400.

In Doing better: setting an agenda for the second decade: Volume E. Proceedings from the panel on appliances and equipment.

This paper provides the reader with a brief discussion of nonazeotropic refrigerant mixtures, and how their properties can be utilized to improve the energy efficiency of vapor compression refrigeration systems. Several potential residential applications for nonazeotropic mixtures are discussed, and the potential energy savings for each application is estimated based on the best available data. 15 references, 5 figures, 4 tables.

33064 (DOE/CE/27460—T9, pp E.226-E.237) **Benefits of replacing residential central air conditioning systems.** McLain, H.; Goldenberg, D. (Oak Ridge National Lab., TN). Aug 1984. American Council for an Energy-Efficient Economy, 1001 Connecticut Ave., NW, Suite 535, Washington, DC 20036. File Number TI87005138. Contract AC05-84OR21400.

In Doing better: setting an agenda for the second decade: Volume E. Proceedings from the panel on appliances and equipment.

The energy efficiency ratios (EERs) of marketed residential air conditioning equipment have increased during recent years. This investigation examined the benefits of replacing a unit having an EER of 6 with a unit having an EER of 10 in prototypical two story house located in 32 US cities. The DOE-2.1A building simulation model was used to predict the energy savings associated with this action. The reasonableness of the model for this study was confirmed by comparing the DOE-2.1A predicted energy use data with measured energy use data for the ACES control house in Knoxville, Tennessee, and four specially metered houses in Little Rock, Arkansas. It is predicted that the seasonal efficiencies (SEERs) of correctly sized units will vary from 0.6 of the rated EERs in the northern part of the country, to 0.8 of the rated EERs in middle part of the country, and to about the rated EERs in the lower southern part of the country. Oversized units were predicted to have lower SEERs. Using 1982 capital and electrical energy costs, simple payback periods were calculated to be as low as 5 years in the lower south regions to about 10 to 15 years in the upper south regions. If the air conditioning unit needs replacement, the simple payback period for the incremental cost of installing a high-efficiency unit was calculated to be about 2 to 5 years in these regions. Further savings would be realized if existing oversized units were replaced with properly sized high-efficiency units. 8 references, 7 figures, 1 table.

33065 (DOE/CE/27460—T9, pp E.280-E.288) **New lighting technologies, their status and impacts on power densities.** Verderber, R.R.; Rubinstein, F.M. (Lawrence Berkeley Lab., CA). Aug 1984. American Council for an Energy-Efficient Economy, 1001 Connecticut Ave., NW, Suite 535, Washington, DC 20036. File Number TI87005138. Contract AC03-76SF00098.

In Doing better: setting an agenda for the second decade: Volume E. Proceedings from the panel on appliances and equipment.

There have been many new lighting products introduced since the 1973 energy crises. The products that entered the market most rapidly were based on existing technologies and relied primarily on reducing light levels to reduce electrical power use. These systems worked for retrofitting existing spaces that were over-illuminated. In the mid-70s, new products employing new technologies were developed that increased the efficacy of producing and distributing visible light. These included the high-frequency operation of fluorescent lamps, replacement of incandescent light sources, and effective management of lighting. These technologies will be described and their present status, with regard to their current use, will be discussed. Their impacts on energy use and on the quantity and quality of illumination will be presented. The results will provide evidence that proposed lighting power densities of 1.5 watts per square foot for lighting can be realized. 8 references, 5 tables.

33066 (DOE/CE/27460—T9, pp 186-197) **Current and future energy end-use consumption in the residential sector.** Lang, K. Aug 1984. American Council for an Energy-Efficient Economy, 1001 Connecticut Ave., NW, Suite 535, Washington, DC 20036. File Number TI87005138.

In Doing better: Setting an agenda for the second decade: Volume E, Proceedings from the panel on appliances and equipment.

Highlights of the trends which are implicit in the end-use consumption projections of residential customers of the Pacific Gas and Electric Company also include efficiency gains and trends in the saturations of various gas and electric appliances. Although some of the projections are specific to Northern California residences, other regions will experience many of the trends. The extent of the substitution of capital for energy in the residential sector only becomes apparent when appliances within each major end-use are examined. The trend does not appear when price and income variables are used to predict consumption. The projections anticipate large gains in energy efficiency by the year 2000. An appendix summarizes additional details of the end-use model. 10 tables.

33067 **(DOE/CE/27460—T25) ACEEE [American Council for an Energy-Efficient Economy] 1986 summer study on energy efficiency in buildings: Volume 2, Proceedings from the panel on small building technologies.** (American Council for an Energy-Efficient Economy, Washington, DC). Aug 1986. Contract FG01-86CE27460. 309p. ACEEE, 1001 Conn. Ave., NW, Suite 535, Washington, DC 20036. File Number TI87005148.

Small building technologies are focused upon in this second volume of the proceedings. Each paper has been separately indexed for inclusion in the Energy Data Base. (BCS)

33068 **(DOE/CE/63485—T4) Coulee CAP business development options: A feasibility study.** (Wisconsin Coulee Region Community Action Program, Inc., Westby (USA)). [1987]. Contract FG01-86CE63485. 25p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010229.

A decision was made for the Wisconsin Coulee Region Community Action Program Inc. to enter the fee-for-service energy auditing and corrective services business. It would be called "The Energy Concern." (DLC)

33069 **(DOE/CS/69135—T4) The Wisconsin Home Energy Rating System: Final report.** Ebisch, L. (Wisconsin Dept. of Industry, Labor and Human Relations, Madison (USA). Safety and Buildings Div.). 30 Sep 1986. Contract FG02-80CS69135. 57p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87009883.

The Wisconsin Home Energy Rating System (HERS) has been developed by the Department of Industry, Labor, and Human Relations under contract to the Department of Administration, Division of State Energy. The contract is funded by the US Department of Energy. The contract calls for development of a home energy rating system for 1- and 2-family dwellings, or adaptation of an already existing one, for one by the State of Wisconsin. The rating system was to be developed in the form of a simple rating tool which could be distributed for testing through municipal building inspectors. At the time it was distributed, results were to be returned and analyzed for accuracy and ease of use. Computer modeling was to be used to verify accuracy. An Ad Hoc Committee of people involved in the home market, in utilities, and in state government energy conservation agencies was established to advise DILHR and DSE staff on development of the rating system. (See Appendix G for a list of the Ad Hoc Committee members). The Ad Hoc Committee had a number of concerns about how the HERS might affect the real estate market, and whether it was worth doing. Their input helped set the direction the HERS was to aim at, and their advice, from several different angles of the home market, was very helpful to staff. This report will give some background on the process of development of the HERS and the Ad Hoc Committee, and then will give details of the technical development.

33070 **(DOE/CS/69135—T5) 1983-1984 Wisconsin energy development and demonstration fund: Evaluation of an energy management plan for a school district.** (Michaels Engineering, Inc., La Crosse, WI (USA)). Sep 1985. Contract FG02-80CS69135. 60p. NTIS, PC A04. File Number DE87009882.

The Energy Management Program was implemented in 1984. This report is an evaluation and review of the Beaver Dam Program. Since the program was only started in 1984, the long term benefits of Energy Management versus Energy Conservation cannot be easily evaluated. The primary purpose of this report is to guide other school districts and similar government units in implementing long range energy conservation through a planned and monitored energy management program.

33071 **(EPRI-EM—5224-Vol.1) An advanced residential heat pump using the supercharged cycle: Volume 1: Final report.** Saunders, J.H. (Brookhaven National Lab., Upton, NY (USA); Electric Power Research Inst., Palo Alto, CA (USA)). May 1987. Contract AC02-76CH00016. 132p. NTIS, PC A07/MF A01 - RRC, Box 50490, Palo Alto, CA 94303; 1; GPO Dep. File Number DE87010291.

The design, analysis, testing and evaluation of an advanced residential heat pump concept are presented. The modification of a 27,000 Btu/hr commercially available reciprocating compressor to incorporate the supercharging cycle (a novel variation of the vapor compression cycle) is described. Experimental results are provided revealing substantial capacity and efficiency improvements at low ambient temperatures. For example, at an evaporating temperature of -15°F and condensing temperature of 110°F, the compressor extracted more than 1.8 times as much heat from the air as the conventional compressor and had a 25% higher efficiency. Furthermore, under these conditions the compressor ran cooler than a conventional welded hermetic unit, with the discharge temperature well within acceptable limits. Seasonal simulations are shown indicating that annual electrical energy use for heating would be reduced by 18%, 16%, 16%, and 14% for the climates of Bismarck, ND, Casper, WY, Pittsburgh, PA, and Washington, DC, respectively. Peak electrical power was predicted to range from 82% to 88% for the new heat pump system compared to a conventional system.

33072 **(EPRI-EM—5224-Vol.2) An advanced residential heat pump using the supercharged cycle: Volume 2, Appendix 9, Machine drawings and photographs: Final report.** Saunders, J.H. (Brookhaven National Lab., Upton, NY (USA); Electric Power Research Inst., Palo Alto, CA (USA)). May 1987. Contract AC02-76CH00016. 62p. NTIS, PC A04 - Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number DE87010292.

Machine drawings and photographs of an advanced residential heat pump concept are presented. (BCS)

33073 **(LBL—18838) The impact of glazing orientation, tilt, and area on the energy performance of roof apertures.** Place, W.; Coutier, P.; Fontoynont, M.; Kammerud, R.; Andersson, B.; Bauman, F.; Carroll, W.L.; Wahlig, M.; Webster, T.L. (Lawrence Berkeley Lab., CA (USA)). Sep 1986. Contract AC03-76SF00098. 32p. (CONF-870101—11). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87009623.

From American Society of Heating, Refrigerating, and Air-Conditioning Engineers meeting; New York, NY, USA (18 Jan 1987).

An investigation has been made of potential reductions in electric lighting and associated thermal impacts of replacing electric light with sunlight admitted through rooftop glazing (i.e., roof monitors and skylights) on a single-story, prototypical office building. Experimental scale models have been used to determine the fraction of the solar radiation entering the aperture that reaches the work plane as useful illumination. This information is used in a developmental version of the building energy analysis computer program BLAST-3.0 to predict reductions in lighting electricity and the impact on energy consumption for heating and cooling the building. The results indicate that a large fraction of the electricity consumed for lighting in a single-story office building can be displaced using modest amounts of glazing in the roof. Reductions in both heating and cooling energy consumption are also possible using a roof aperture system in conjunction with proper control of the electric lights, but the potential heating and cooling benefits are substantially smaller than the potential reductions in electric lighting. The design implications of the results are discussed and future directions for the work are outlined.

33074 **(LBL—21004) Maintaining optimum fluorescent lamp performance under elevated temperature conditions.** Siminovitch, M.J.; Rubinstein, F.M.; Clark, T.A.; Verderber, R.R. (Lawrence Berkeley Lab., CA (USA)). Apr 1986. Contract AC03-76SF00098. 15p. (CONF-8608179—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009155.

From Annual Illuminating Engineering Society conference; Boston, MA, USA (16 Aug 1986).

This paper describes a new technique for optimizing fluorescent lamp performance under elevated temperature conditions. This approach uses a thermo-electric Peltier device to produce a localized cold spot temperature of approximately 40°C, allowing the lamps to maintain maximum light output and efficacy independent

of prevailing ambient temperatures inside a luminaire. Experimental data show that a 20% increase in light output and a 10% increase in efficacy over typical lamp performance in a warm fixture environment can be obtained using this device. Only 0.25 watts must be supplied to the Peltier device to produce these results.

33075 **(LBL—21576) Experimental verification of a model of heat transfer through windows.** Arasteh, D.; Hartmann, J.; Rubin, M. (Lawrence Berkeley Lab., CA (USA)). Dec 1986. Contract AC03-76SF00098. 10p. (CONF-870101—13). NTIS, PC A02. File Number DE87007609.

From American Society of Heating, Refrigerating, and Air-Conditioning Engineers meeting; New York, NY, USA (18 Jan 1987).

A procedure has been developed for calculating the one-dimensional heat flux through complex window systems. A computer program embodying this procedure (WINDOW 2.0) is available to the public. The window may consist of multiple glass or plastic layers, separated by gas-filled spaces. Gases other than air may fill the space between solid layers, and the layers may have low-emissivity coatings. Measurements from five different manufacturers and researchers of the overall thermal conductance of various window systems confirm the validity of this model for a range of temperatures and layer spacings less than 3 cm (1.2 in). A list of U-values and shading coefficients is given for a representative group of windows.

33076 **(LBL—21884) The effect of lighting system components on lighting quality, energy use, and life-cycle cost.** Rubinstein, F.; Clark, T.; Siminovitch, M.; Verderber, R. (Lawrence Berkeley Lab., CA (USA)). Jul 1986. Contract AC03-76SF00098. 8p. (CONF-860903—2). NTIS, PC A02. File Number DE87009150.

From IEEE-Industry Applications Society annual meeting; Denver, CO, USA (28 Sep 1986).

A computational method was developed to examine the effect of lamp, ballast, and fixture selection on the quality and quantity of illumination, energy consumption, and life-cycle cost of lighting systems. Applying this analysis to lighting layouts using different lamp/ballast/fixture combinations suggested that combinations with higher lumen outputs reduced the uniformity of the illuminance distribution at the workplace but did not reduce visibility levels. The use of higher lumen output lamp/ballast/fixture systems and higher efficiency components tended to reduce life-cycle costs as long as the premium cost of the components was not too high.

33077 **(PB—87-172805/XAB) Advanced desiccant materials assessment. Final report, February 1985-May 1986.** Collier, R.K.; Cale, T.S.; Lavan, Z. (Enerscope, Inc., Glendale, AZ (USA)). Apr 1986. 155p. NTIS, PC A08/MF A01.

The objective of the research was to determine the desiccant adsorption properties that would maximize the performance of a gas-fired open-cycle desiccant cooling device. Our approach to the problem was to hypothesize that the maximum performance possible would be achieved by containing the thermal and mass wavefronts within the desiccant bed for both the dehumidification and the regeneration processes. Various hypothetical desiccant materials and silica gel were investigated using a computer model. Parameters such as desiccant loading, desiccant density, air conditions, adsorption properties, etc. were varied. Results of the research showed that the parameters which enhance performance for one process (dehumidification or regeneration), reduce performance for the other. The most desired desiccant therefore, becomes a compromise between the two processes. The desiccant that achieves the best compromise is a fairly well-defined Brunauer Type 1 material. Systems analyses using the material indicated that COP's of 1.3 were possible under standard operating conditions. More importantly, the specific cooling capacity (inverse of physical size) was extremely large. Not only is the thermal efficiency higher than with other materials, but the cooling capacity is markedly higher.

33078 **(PB—87-176335/XAB) Gas-engine heat-pump system and component efficiency and reliability improvement. Phase 1 report, June 1985-January 1987.** (Battelle Columbus Div., OH (USA)). Jan 1987. 113p. (N—4577-0901). NTIS, PC A06/MF A01.

The Gas Research Institute is directing several research projects to develop gas-fired heat pumps for residential and light commercial use. The project work discussed here identifies and evaluates potential improvements in the cycle and key components of these heat pumps and provides short- and long-term inputs for the heat-pump product-development efforts. Principal results of Phase I studies under the project are: test procedures for gas-fired heat pumps (GFHP), a cycle-analysis model for GFHPs, an assessment of appropriate compressor technology for GFHPs, specification of fan-operating strategies, a review of emission standards for GFHPs, identification of low-temperature capacity enhancement issues, a guide on the sizing of field tests, current assessments of foreign technology valuable to GFHPs, and an assessment of the health and safety attributes of methylene chloride.

33079 **(PB—87-176350/XAB) High efficiency hydronic heating unit. Final report, November 1983-January 1987.** McGlothlin, S.D.; Stelmar, G. (Teledyne Laars, Hollywood, CA (USA)). 1 Jan 1987. 49p. NTIS, PC A03/MF A01.

A new-concept, compact high efficiency hydronic heating unit was developed incorporating a radiant-surface fiber matrix burner firing downward to a horizontal multiple-row copper finned-tube heat exchanger. In developing the prototype unit, several technical challenges were addressed, such as burner qualification, heat-exchanger performance and corrosion protection, control challenges and proof of reliability. The unit has an efficiency of 90% or more and promises to be of competitive cost. It is of a scalable configuration so a wide range of sizes can be produced with economical manufacturing processes.

33080 **The impact of wind-induced ventilation on residential cooling load and human comfort.** Byrne, S.J.; Huang, Y.J.; Ritschard, R.L.; Foley, D.M. (Building Energy Analysis Group, Energy Analysis Program, Lawrence Berkeley Lab., Univ. of California, Berkeley, CA 94720). *ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) Transactions;* **92**: No. 2B, 793-803(1986). (CONF-8606125—). Contract AC03-76SF00098.

From ASHRAE annual meeting; Portland, OR, USA (22 Jun 1986).

This paper describes an analysis of long-term, hourly weather data in several climates to determine the conditions for which available wind speed and coincident temperature and humidity can be used to meet human comfort conditions. By calculating the change in enthalpy produced by a typical residential air conditioner during those hours when an occupant is uncomfortable, we were able to estimate the impact of natural ventilation on building cooling load. The results are summarized in graphic formats, which allow a designer to determine the effect of ventilation on human comfort, the orientation of building openings that will maximize ventilative cooling of the building occupants, and the potential cooling load reduction due to increasing the ventilation air speed in typical residential buildings. The analysis makes use of the Pierce Two Node Comfort Model and a data base of residential cooling loads developed with the DOE-2 building energy simulation program (BESG 1985).

33081 **The project on restaurant energy performance end-use monitoring and analysis.** Mazzucchi, R.P. (Technology Performance Analysis, Energy Systems Dept., Pacific Northwest Lab., P.O. Box C-5395, Seattle, WA 98105). *ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) Transactions;* **92**: No. 2B, 328-352(1986). (CONF-8606125—).

From ASHRAE annual meeting; Portland, OR, USA (22 Jun 1986).

This paper summarizes the results of a research program intended to build an understanding of restaurant energy performance upon an empirical foundation. This discussion provides some background for the effort, brief descriptions of the facilities selected for study, the methods of measurement, the empirical findings, an overview of conservation opportunities revealed, and general conclusions. Seven monitoring sites were carefully selected to represent the most common categories of food service by the National Restaurant Association. A microcomputer-based data acquisition was

designed and implemented to acquire data at 15-minute intervals on end-use energy consumption, interior temperatures, and external climatic conditions for a one-year monitoring period. The project archived over 87% of the available data, which have been converted into several formats for dissemination.

33082 **Fan electricity consumption for variable air volume.** Spitler, J.D.; Pedersen, C.O.; Hittle, D.C.; Johnson, D.L. (Dept. of Mechanical and Industrial Engineering, Univ. of Illinois, Urbana-Champaign, IL). *ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) Transactions;* **92**: No. 2B, 5-18(1986). (CONF-8606125—).

From ASHRAE annual meeting; Portland, OR, USA (22 Jun 1986).

HVAC designers choosing variable air volume (VAV) systems have several options for modulating the flow. Some of the more popular methods for centrifugal fans are discharge dampers, inlet vanes, and motor speed control. This paper describes a study in which these different methods of fan modulation are compared for two prototypical buildings in five locations in the United States. The tool used to compare the methods is the Building Loads Analysis and System Thermodynamics (BLAST) program. In addition, factors affecting the results are also examined. In particular, a detailed examination of the annual building load distribution is made.

33083 **An update of free-piston Stirling engine heat pump development.** Ackermann, R.A.; Clinch, J.M.; Privon, G.T. (Free-Piston Engine Program, Mechanical Technology Inc., Latham, NY). *ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) Transactions;* **92**: No. 2B, 160-173(1986). (CONF-8606125—).

From ASHRAE annual meeting; Portland, OR, USA (22 Jun 1986).

A Free-Piston Stirling Engine Heat Pump (FPSE/HP) for residential applications has been under development for the past five years. The system consists of a natural gas combustor, free-piston Stirling engine, and a variable-stroke resonant piston refrigerant compressor. The compressor is linked to the engine via a unique hydraulic transmission that provides for both efficient power transfer and hermetic sealing between the engine working fluid (helium) and the compressor refrigerant. This development effort has led to a breadboard heat pump power module, engine/transmission/compressor, that has undergone a comprehensive test program to evaluate the performance of an FPSE/HP and to judge its potential for further development. The results obtained from this testing are presented in this paper.

33084 **Real-time in-situ refractometer for concentration measurements in absorption machines.** Bostick, D.T.; Klatt, L.N.; Strain, J.E.; Perez-Blanco, H. (Analytical Chemistry Div., Oak Ridge National Lab., Oak Ridge, TN 37831). *ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) Transactions;* **92**: No. 2B, 174-188(1986). (CONF-8606125—). Contract AC05-84OR21400.

From ASHRAE annual meeting; Portland, OR, USA (22 Jun 1986).

An in-situ, real-time refractometer has been developed for the measurement of absorbent concentration in absorption machines. The refractive index of the absorber fluid is determined by measuring light loss from optical fiber cables that are immersed in the solution. The optical fibers have been modified by removing a portion of the cladding from the center of hard clad fiber optics to expose a segment of the core. The exposed portions of the fiber cores are placed at points within an absorption machine for which the measurement of absorbent concentration is desired. The entrance face of all modified fibers is illuminated with a light source. The amount of light lost from the core of each fiber to the absorber solution surrounding the fiber is measured and is directly related to the refractive index of the solution.

33085 **Combustion testing methods for catalytic heaters.** Kweller, E.R. (National Bureau of Standards, Gaithersburg, MD). *ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) Transactions;* **92**: No. 2B, 239-257(1986). (CONF-8606125—).

From ASHRAE annual meeting; Portland, OR, USA (22 Jun 1986).

Both vented and unvented designs of catalytic heaters using natural gas and propane as the fuel were tested by three test methods. The objective of the study was to determine an appropriate laboratory test method for determining the percentage of unreacted fuel during typical heater use. Results of this study are expected to be useful for manufacturers who are currently developing an ANSI standard for catalytic heaters and by the Department of Energy for their Appliance Efficiency Test Procedures. Results showed that an analytical approach of calculating unreacted fuel using a carbon balance was equivalent to an empirical method. Results of tests in two open-room test methods and one closed room test method showed that the methods to use will depend on whether the heater is vented or unvented. A closed room method was shown to yield results consistent with those obtained by open-room methods for the unvented heater, and may be used in place of an open-room method if the room oxygen is not depleted below 19% as an endpoint of the test. A completely sealed test room was found to be unnecessary for this closed room test.

33086 **SP43 evaluation of system options for residential forced-air heating.** Jakob, F.E.; Locklin, D.W.; Fischer, R.D.; Flanigan, L.J.; Cudnik, R.A. (Energy and Thermal Technology Section, Battelle, Columbus Div., Columbus, OH). *ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) Transactions;* **92**: No. 2B, 644-673(1986). (CONF-8606125—).

From ASHRAE annual meeting; Portland, OR, USA (22 Jun 1986).

ASHRAE Special Project SP43 has developed and experimentally validated a dynamic simulation model for analyzing the thermal performance and energy utilization of residential forced-warm-air heating systems. This paper describes the use of the model to compare various system and control options, with the objective of generating information for the Equipment Volume of the ASHRAE Handbook. System component efficiencies and dimensionless energy factors are defined that describe the furnace, duct system, system-induced loads, and total system performance on an annual basis. These factors were generated by the SP43 model for over 40 example cases, selected to show the effect of system and control variables on overall performance. These variables include: furnace and venting types, installation location and combustion air source, furnace sizing, night setback, thermostat cycling rate, blower operation strategy, basement insulation levels, duct sealing and insulation, house and foundation type, and climate. Four house types were examined: a two-story house with basement, and a ranch-style house with basement, crawl space, and slab. Three climates were examined using ASHRAE WYEC weather tapes: Nashville, Pittsburgh, and Minneapolis.

33087 **Wind tunnel and full-scale data on airflow from natural ventilation and ceiling fans.** Chandra, S.; Fairey, P.W.; Keresteciogiu, A.A.; Kamel, A.A. (Research and Development Div., Florida Solar Energy Center, Cape Canaveral, FL). *ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) Transactions;* **92**: No. 2B, 804-814(1986). (CONF-8606125—).

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The state of the art on predicting airflows from natural ventilation is discussed. The usefulness and limitations of wind-tunnel-derived building pressure coefficient data in predicting airflow are presented. Actual measured full-scale field data are provided to show the effects of atmospheric turbulence, window type, and insect screening on airflow. Also presented are airflow and airspeed data from ceiling fans.

33088 **National program planning: Philosophy and example.** Lundy, T.S. (Oak Ridge National Lab.). pp K168-K174 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—). Contract AC05-84OR21400.

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

Numerous examples of national program planning may be cited. All are linked to purpose and philosophy of their development and have various schemes for implementation. In the energy area, they vary from an abortive weekend assignment to a former presidential aide to much more successful endeavors. All are intended to be guiding lights for future actions to assist in solving national energy problems. This paper shares background information, philosophy of approach, and current status for planning of national scope which concentrates on research needed to improve energy efficiencies of the thermal envelopes of our national stock of buildings. This specific effort, initiated during 1977, has resulted in two major national planning documents with a third now conceived.

33089 **The Carmel Valley Workshop: Developing a national building energy research agenda.** Frankel, E. (Carmel Valley Workshop). pp K151-K167 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

On January 12-14, 1983 a workshop on Building Energy Research (BER) was held at the Carmel Valley Inn, sponsored by the House Committee on Science and Technology (HS&T), the U.S. Department of Energy, the Electric Power Research Institute, the Gas Research Institute, the National Association of Home Builders Research Foundation, the American Institute of Architects, and the American Society of Heating, Refrigeration and Air Conditioning Engineers. The objective of the workshop was to formulate a national agenda for research in energy efficiency and solar energy related to buildings. The need for a national buildings research agenda was created by the Administration's decision to request no funds for building energy research in its FY 1983 Department of Energy budget request (January, 1982). This decision led a group of building industry trade associations and energy-related public interest groups to develop a proposal for a "comprehensive and integrated building energy research program," which was presented to the HS&T Committee in April, 1982 and became the subject of a hearing on July 22, 1982. At the hearing several witnesses presented detailed buildings energy research plans for the Subcommittee's consideration. To combine and prioritize the many different research items proposed in the plans, the Committee decided to convene a workshop of specialists, which became the "Carmel Valley Workshop."

33090 **The Solar Technical Information Program (STIP) - A model for conservation technology transfer.** Berberich, C.W.; Potter, T.F. (Solar Energy Research Institute). pp K115-K126 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

There is a broad agreement that technology transfer planning must be an intimate part of the elaboration of a national building research agenda. This paper describes processes now in use by DOE's Solar Technical Information Program (STIP) to address the technical information requirements of interest parties and discusses considerations for potential application to buildings conservation technologies. STIP researcher, develops, and produces Technical Communication Publications reflecting developments in solar research; announces their availability to targeted technical audiences from a file of 40,000 scientists, technologist, and other professionals in solar technologies; facilitates their distribution in the most cost effective manner; and operates a Technical Inquiry Service, staffed by solar professionals, to provide answers to technical questions concerning solar technology R&D. Parallels between solar and conservation user needs are drawn and the conclusion supported that a Conservation Technical Information Program would be beneficial.

33091 **Residential standards demonstration program.** Hart, W.; Selby, J. (Bonneville Power Administration). pp G16-G27 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

The Residential Standards Demonstration Program is designed to demonstrate the savings and costs of the Model Conservation Standards proposed by the Northwest Power Planning Council. The Program is co-sponsored by the Bonneville Power Administration (BPA) and the energy agencies of the four northwest States. The program includes incentives for up to 700 single-family homes, and 70 multifamily buildings. The incentives are approximately equal to the average incremental costs of the Standards. The costs will be recorded using an accounting system developed by the Northwest's Home Builders Association, with a control sample of 100 "matched pairs." Planning began in mid-1983, with BPA contracting with each State for the development of program details in their respective States. Selection of the participating builders was conducted in later winter, construction beginning in late spring, and occupancy targeted for October 1984. The response to date, and the overall structure of the program is discussed.

33092 **Verifications of building energy use models: A compilation and review.** Wagner, B.S. (Lawrence Berkeley Lab.). pp B299-B312 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—). Contract AC03-76SF00098.

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

Computer models of building energy use currently play a fundamental role both in theoretical studies of energy conservation and in actual conservation programs. The success of these and new applications (e.g. home energy ratings) hinges to a large degree on the accuracy of model predictions. To test model accuracy, a number of studies have compared model predictions to measured energy use in actual buildings. Because the studies span a wide range of model complexity, quality of input and consumption data, and type of verification intended, this compilation categorizes and reviews over two dozen studies, comprising about 100 simulations of building energy use, performed with 18 models, each using anywhere from 1 to 243 buildings. This paper summarizes the results of individual studies, discusses the effects of monitoring detail, time scale of predictions, occupancy, and type of verification performed, and outlines some implications for the use of models in both theoretical and field applications.

33093 **Energy calculation slide rules for single-family houses.** Ritschard, R.; Huang, Y.; Verzhbinsky, G.; Turiel, I.; Wilson, D. (Energy Analysis Program, Lawrence Berkeley Lab., Berkeley, CA 94720). pp B259-B269 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—). Contract AC03-76SF00098.

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

As a part of a Department of Energy sponsored program, a simplified energy analysis method was developed for site-built, single-family houses consisting of a set of slide rules with interchangeable inserts, plus a user's manual with additional tables for optional correction terms. Together these two items allow users to estimate the energy savings and to determine the effectiveness of a large range of conservation measures for houses built anywhere in the United States. The technical foundation for the slide rules is a large data base of over 10,000 computer simulations created using the DOE-2.1A energy simulation code. They analyzed this data base and reduced it to sets of tables showing the incremental savings due to various conservation measures for different house types in different locations. The slide rules are graphic representations of

these tables, and permit users to recreate the data base by simply aligning the appropriate tabs. The slide rule calculates changes in energy use as a function of building characteristics, equipment efficiency and location recreating the results of a complex state-of-the-art analytical procedure without substantially sacrificing accuracy or requiring special technical knowledge.

33094 **Raising the energy efficiency of manufactured housing.** Mills, E. (Lawrence Berkeley Lab.). pp B193-B206 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—). Contract AC03-76SF00098.

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

Monitored performance data for manufactured homes is scarce, especially for cooling and water heating energy consumption which, due to geographic distribution, may be in fact more important to energy consumption by the stock than is heating. The authors compare available heating energy use data for 39 energy-efficient manufactured homes built in the U.S. and abroad. The most successful house uses only 12.3 kJ/(m/sup 2/-C). In contrast, mobile homes built to HUD standards use an average of 229.3 kJ/(m/sup 2/-C). Simulated performance of Swedish panelized homes and new domestic designs are also presented. Retrofitted mobile homes in Minnesota had lower initial energy use than comparable site-built homes and demonstrated poorer economic performance. They review recent research and proposed policies, including the prospects for energy ratings. The need to optimize the economic and energy performance of these unique dwellings is a worthwhile component of a buildings research agenda.

33095 **Market response for affordable housing: The results of the energy-efficient home project of Oregon.** Miller, K.; Havener, G.; Tabachnikov, A. (Bonneville Power Administration). pp B183-B192 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

This paper describes a completed project which was coordinated by the Energy Efficient Housing Group, sponsored by the Bonneville Power Administration. The project addressed the marketability of efficient lower priced homes. The project created an opportunity for builders to voluntarily upgrade thermal performance of home designs. The driving force behind the project was a pool of low-interest rate mortgage money (9 3/4 percent, 30-year fixed rate) provided by the Oregon Department of Commerce Housing Division. The mortgage capital was serviced by a savings bank which was willing to consider monthly energy savings in its loan qualification of buyers. Fourteen homes were built and sold; they are being triple-metered, and partial energy usage data is presented in the paper. Government monies invested in this project were leveraged at a ratio of 1:40.

33096 **Home energy rating systems: Sample approval methodology for two tools.** Huang, Y.J.; Dickinson, B.; Hsui, C.; Rosenfeld, A.H.; Wagner, B.S. (Lawrence Berkeley Lab.). pp B135-B143 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

Over the past ten years a number of systems have been developed to rate the energy efficiency of single-family houses. These systems can be categorized as either calculational, prescriptive, or performance systems. Calculational systems range from simple degree-day methods to large computer simulation codes. Prescriptive systems are derived from calculations, but require only simple arithmetic to produce points, labels, and, in more elaborate ones, actual energy use. Performance systems are those that use past utility bills as a basis for assigning ratings. At present, different rating systems are apt to give divergent values due to differences in their assumptions as well as calculational methods. If the public is to accept the validity of rating systems, there must be a method to assess their accuracy and to certify those that are technically reliable. The certification procedure can also diagnose those areas where rating systems need improvement, and suggest ways of bringing compatibility to the present chaos in rating system numbers.

33097 **Measured energy savings from residential retrofits: Updated results from the BECA-B project.** Goldman, C. (Lawrence Berkeley Lab.). pp B107-B121 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—). Contract AC03-76SF00098.

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

This study summarizes measured data on energy savings from conservation retrofits in existing residential buildings. Initial data from the Buildings Energy-Use Compilation and Analysis (BECA) residential data base were presented in the 1982 ACEEE Summer Study. The authors have updated the compilation and present results from approximately 115 data sources (almost double the size of the initial study) in four general categories: utility-sponsored conservation programs, low-income weatherization programs, research studies, and multi-family buildings. They analyze aggregate and individual household energy consumption and retrofit cost data and express results from retrofit projects in a standardized format; in the process, they summarize current retrofit experience and identify major data gaps. The sample size for each project varies greatly, ranging from individual buildings to 33,000 homes. Most retrofit projects included in the data base attempted to reduce space heating consumption.

33098 **Survey contributions to program evaluations.** Windell, P.A. (Bonneville Power Administration). pp K91-K103 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

Traditional program evaluations classically involve the use of experimental or quasi-experimental designs. Due to the costs associated with the collection of data, a simultaneous survey designed to serve additional purposes may serve both as a benchmark and a control group source pool. The 1983 Pacific Northwest Residential Energy Survey (PNWRES) was designed to explicitly account for the needs of the evaluation of BPA's residential weatherization program. This paper briefly describes this strategy and how it was implemented. The paper also describes plans for future coordination.

33099 **Minnesota RCS: Myths and reality.** Polich, M.D. (Minnesota Dept. of Energy and Economic Development). pp G141-G151 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

The Residential Conservation Service (RCS) Program is probably the single largest federal government effort to reduce energy consumption in the residential sector. Over three-quarters of all states, including Minnesota, are operating RCS programs. This paper describes the Minnesota program, which although statistically above average nationwide, is plagued by many of the same problems that are apparent in other states: low participation rates, high audit costs and low energy savings. The hard reality is that the failure in Minnesota, and probably nationwide is due largely to the fact that the program relies on the utility companies to deliver the service. The utility companies have no incentive, aside from positive customer relations, to provide a quality service. They advertise

minimally although a test marketing experiment done in Minnesota demonstrated that the audit response rate could be increased up to ten fold through a variety of inexpensive techniques. They rely on their own salaried employees to conduct audits when the audits are being done by community groups at less than half the cost.

33100 **Evaluation of utility home energy audit (RCS) programs.** Hirst, E. (Oak Ridge National Lab.). pp G28-G40 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

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For a variety of reasons, particularly the federally mandated Residential Conservation Service (RCS), most electric and gas utilities provide free or low-cost energy audits to their residential customers. Many utilities also offer financial incentives (low- or zero-interest loans, rebates) to encourage installation of measures recommended in the audits. Recently, detailed quantitative evaluations have been conducted of these programs in a few locations. This paper reviews the findings of evaluations conducted in the Pacific Northwest, California, Wisconsin, Minnesota, Michigan, and Connecticut concerning the energy savings that can be attributed to these programs. The key feature of these evaluations is their reliance on actual fuel consumption records (electricity, natural gas, and fuel oil bills). RCS programs in these states yield incremental energy savings for program participants of approximately 3 - 5%. That is, households who receive home energy audits take conservation actions that reduce their annual fuel bills by 3 - 5% more than the saving experienced by program nonparticipants.

33101 **New lighting technologies: Their status and impacts on power densities.** Verderber, R.R.; Rubinstein, F.M. (Lighting Systems Research Group, Lawrence Berkeley Lab.). pp E280-E288 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—). Contract AC03-76SF00098.

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

There have been many new lighting products introduced since the 1973 energy crises. The products that entered the market most rapidly were based on existing technologies and relied primarily on reducing light levels to reduce electrical power use. These systems worked for retrofitting existing spaces that were over-illuminated. In the mid-70s, new products employing new technologies were developed that increased the efficacy of producing and distributing visible light. These included the high-frequency operation of fluorescent lamps, replacement of incandescent light sources, and effective management of lighting. These technologies are described and their present status, with regard to their current use, are discussed. Their impacts on energy use and on the quantity and quality of illumination are presented. The results provide evidence that proposed lighting power densities of 1.5 watts per square foot for lighting can be realized.

33102 **Benefits of replacing residential central air conditioning systems.** Mc Lain, H.; Goldenberg, D. (Energy Div., Oak Ridge National Lab.). pp E226-E237 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—). Contract AC05-84OR21400.

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

The energy efficiency ratios (EERs) of marketed residential air conditioning equipment have increased during recent years. This investigation examined the benefits of replacing a unit having an EER of 6 with a unit having an EER of 10 in a prototypical two story house located in 32 U.S. cities. The DOE-2.1A building simulation model was used to predict the energy savings associated with this action. The reasonableness of the model for this study was confirmed by comparing the DOE-2.1A predicted energy use data with measured energy use data for the ACES control house in Knoxville, Tennessee, and four specially metered houses in Little Rock, Arkansas. It is predicted that the seasonal efficiencies (SEERs) of correctly sized units will vary from 0.6 of the rated EERs in the northern part of the country, to 0.8 of the rated EERs in the middle part of the country, and to about the rated EERs in the lower southern part of the country. Oversized units were predicted to have lower SEERs.

33103 **An assessment of the energy saving potential of nonazeotropic refrigerant mixtures.** Levins, W.P. (Energy Div., Oak Ridge National Lab., Oak Ridge, TN 37831). pp E198-E213 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—). Contract AC05-84OR21400.

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

This paper provides the reader with a brief discussion of nonazeotropic refrigerant mixtures, and how their properties can be utilized to improve the energy efficiency of vapor compression refrigeration systems. Several potential residential applications for nonazeotropic mixtures are discussed, and the potential energy savings for each application is estimated based on the best available data.

33104 **Electric water heater standby losses: Comparison of conservation strategies and their energy savings.** Ek, C.W.; Auburg, C.D. (Bonneville Power Administration). pp E77-E89 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

An examination of the standby energy losses of conventional and high efficiency electric water heaters, including a comparison of losses resulting from various piping configurations. Pipe configurations are representative of high level and low level piping found in garage, crawlspace and basement water heater installations. Savings resulting from retrofit insulation wraps, insulated based, insulated piping and anticonvection valves are compared. Estimates of savings associated with the use of an energy-efficient water heater compared to a conventional one averaged 46 percent, with projected annual savings of 481 kWh. For tanks with an external insulation blanket, the energy-efficient tank saves approximately 28.5 percent, with projected annual savings of 168 kWh. Additional energy losses due to overhead and low-level piping ranged from 12-1/2 percent for the conventional tank to 20 percent for the high efficiency tank when compared to the bare-tank standby loss condition.

33105 **Predicting the performance of heat pump water heaters.** Biemer, J.R.; Anderson, K. (Bonneville Power Administration). pp E38-E48 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

A widely applicable technique is presented which predicts the site specific performance of heat pump water heaters (HPWH's). The methodology uses the Gas Appliance Manufacturers Association "energy factor" rating, average monthly ambient and water temperatures, water heater set point, house characteristics, and hot water usage to determine annual energy requirements and energy savings. This technique is used to develop a performance prediction table for various cases in Portland, Oregon. Preliminary conclusions especially regarding the interrelationship of HPWH's and space heating and the effect of energy factor variation on energy usage, are given. Data from Bonneville Power Administration's HPWH Regional Field Test will be used to modify and validate the performance prediction technique.

33106 **Energy efficient housing in Sweden.** Schipper, L. (Lawrence Berkeley Lawrence, Rm. 3125, Bldg. 90, Berkeley, CA 94720). pp J109-J126 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

Swedish homes use 30 - 50% less heat, adjusted for climate and house size, than do homes in the US. Swedish technology often saves energy at lower cost per unit of energy saved than the for similar technologies in the US. Moreover, Swedes have saved energy because it was profitable to do so; they were not forced to do so by draconian regulations. Instead a healthy partnership of private initiative, public financing incentives and research and demonstration, and a long time horizon on the part of house buyers, builders, and occupants, combined to provide the greatest indoor comfort in the OECD at the lowest cost. The technical achievements that allowed these savings in Sweden are transferable to the United States and should be economically attractive in the US as well. The only fundamental policy difference between Sweden and the US is the greater use of incentives in Sweden to reinforce a national commitment towards quality housing, for all Swedes, built for the long run.

33107 **Analysis of federal appliance energy efficiency standards.** Levine, M.D.; Chan, P.; Mc Mahon, J.E.; Ruderman, H. (Lawrence Berkeley Lab.). pp G57-G70 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—). Contract AC03-76SF00098.

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

This paper treats the major issues involved in the assessment of the economic impacts of appliance efficiency standards on consumers. The discussion summarizes the method used in analyzing standards, many of the key issues raised by the standards, the most important findings and results of the analysis, and some comments on selected issues. The basic conclusion of the paper is that the analysis to date supports a finding that the net results of energy efficiency standards on residential appliances and space conditioning equipment are favorable from the perspective of energy and economic savings to consumers and to the nation as a whole. Although recognizing key sources of uncertainty, the authors note that a range of analyses performed by the study team using different assumptions have shown beneficial impacts of standards. In spite of the fact that the U.S. Department of Energy (DOE) has issued a final rulemaking that requires no standards on residential appliances, the policy issues are still alive.

33108 **BPA radon field monitoring study.** Thor, P.W. (Bonneville Power Administration). pp B283-B298 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

To learn more about radon in homes, and in particular, to determine the concentrations and ranges of concentrations in typical Pacific Northwest residences, the Bonneville Power Administration (BPA) conducted a Radon Field Monitoring Study during the 1982-83 winter heating season. Approximately 290 Northwest homeowners received up to three small passive radon detectors with instructions for deployment within their homes. After two to three months of exposure the detectors were returned for processing and analysis. Radon concentrations and basic house information were obtained for 270 houses located in just over 100 different locations in the region. Results of the monitoring and statistical analyses completed on the data are presented. Histograms are shown indicating the ranges of concentrations in various spaces within a residence. Correlations between these concentrations and house characteristics and construction styles are also presented.

33109 **Humidity in attics - Sources and control methods.** Cleary, P. (Lawrence Berkeley Lab.). pp B29-B41 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—). Contract AC03-76SF00098.

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

Guidelines for the control of moisture in attics are in a state of flux. The 1981 ASHRAE Handbook of Fundamentals gives only "Past Practice", and notes that such practice might not be currently valid. Furthermore, in the past it was assumed that the attic was an inert structure on which moisture would either condense or pass through unaffected. Results are presented which show that the attic is in a constant state of flux, absorbing and releasing moisture. A mathematical model for predicting the moisture content of attic wood members is presented. The model is used to predict hour-by-hour attic air humidity ratio, and seasonal wood moisture content. Results are compared with measured data. The application of the model to the re-calculation of attic ventilation standards is discussed, both with respect to condensation and wood rot.

33110 **Learning about commercial program design: Bonneville Power Administration's purchase of energy savings.** Schick, H.; Michaelson, M. (Bonneville Power Administration). pp I202-I212 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

The Bonneville Power Administration (BPA) is conducting a commercial buildings retrofit field test to examine the feasibility of stimulating conservation in the Pacific Northwest by making payments to a sponsor, such as an energy service company or equipment manufacturer, for energy savings which actually occur in a commercial building. This field test is one of several activities BPA is conducting to develop the capability to conserve energy in the commercial sector of electrical energy use. In each test case, the sponsor is responsible for locating interested building owners, performing energy audits, negotiating an agreement with each building owner, and arranging the financing, installation, operation and maintenance of energy conservation measures (ECM's). This paper describes the Program's background, the benefits of the approach, the program design, and the lessons learned through proposal review and contract negotiations.

33111 **A balanced measurement/calculation-based approach to building energy analysis.** Subbarao, K.; Flowers, L. (Solar Energy Research Institute, 1617 Cole Boulevard, Golden, CO 80401). pp C253-C267 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

Of vital importance is a thermal model for building simulation with input parameters that are accessible to measurement. If the thermal model is a large model such as DOE 2.1, measurement of all the inputs (conductivities, specific heats etc., of all the wall layers as well as determining construction anomalies) is too expensive for all but a small number of buildings. A different approach to simulations and measurement of the inputs is needed. In this article, an approach called BEVA (Building Element Vector Analysis) is outlined in which short-term monitoring provides whole building (or zone) parameters that then serve as inputs to an hour-by-hour simulation. These "system parameters" can also be calculated from component parameters, in turn, can either be measured directly or calculated from material properties. Potential applications for BEVA include ratings of buildings from short-term monitoring, diagnostics of buildings and HVAC systems to determine retrofit savings, ratings of passive components through laboratory tests, and

design tools that can be directly related to measurements and ratings.

33112 **Measuring conservation - A report on instrumentation in the Hood River Conservation Project.** Oliver, T.; Peters, D.; Peach, H.G.; Engels, D. (Bonneville Power Administration). pp I274-I285 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

Conservative monitoring for Hood River Conservation Project, a $20 million test of the practical potential of residential energy conservation, is presented. Experience in acquisition, installation, and use is reported. Instrumentation includes monitors for total load, space heat, water heat, wood heat, indoor temperature, and outdoor weather conditions. The Project includes 320 load study homes, a distribution load monitor, and three weather stations. The radiometer monitoring system for wood heat was designed specially for the Project.

33113 **Field inspection procedures for financial audit of residential weatherization program.** Ingram, A.E. (Bonneville Power Administration). pp I132-I143 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

Proposed error valuation procedures are developed which might be used to support financial audits of the Bonneville Power Administration's (BPA) residential weatherization contracts. These contracts provide utility customers of BPA programmatic and financial support for retrofit home weatherization projects. To date, more than 80,000 homes have been weatherized under this program in Montana, Oregon, Washington, and Idaho, at a cost of approximately $130 million dollars. The proposed procedures described in this paper would provide a consistent, conservative methodology for the evaluation of non-compliance with the technical provisions of BPA weatherization contracts. In some circumstances, this would result in reimbursements that match the value received by BPA.

33114 **Improving the regulatory approach to increased rental housing energy efficiency: The Minnesota case study.** Hubinger, G. (Minnesota Dept. of Energy and Economic Development). pp C68-C82 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

While Minnesota has begun to initiate and implement informational and financing programs, its major focus has been regulatory. The state legislature authorized the adoption of minimum mandatory energy efficiency standards for existing rental residences in 1977. However, that program has been ineffective. First, the standards (adopted through administrative rule) were weak and inappropriate for the variety of building types. Second, the legislature never appropriated funding to establish a serious campaign to inform owners of the mandatory requirements and to actively enforce compliance. This paper reviews the history of the development of the legislation and of the standards, describes the inherent difficulties in implementing a standards program, reviews recent efforts made to make the program more effective and summarizes other critical components of a comprehensive program to increase the energy efficiency of rental housing.

33115 **A summary report of BECA-CN: Buildings energy-use compilation and analysis of energy-efficient new commercial buildings.** Wall, L.W.; Piette, M.A.; Harris, J.P. (Lawrence Berkeley Lab.). pp D258-D274 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—). Contract AC03-76SF00098.

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

Energy consumption data have been compiled and analyzed for 124 new commercial buildings. Offices and schools are the dominant building types in the data base; over 70 percent of the buildings have floor areas larger than 50,000 ft/sup 2/ (4647 m/sup 2/). A majority of the buildings in the present compilation are government-owned and occupied. The authors discuss specific energy-saving features and design strategies. Summary tabulations for other building characteristics such as type of energy, year of construction, location, and climate zone are presented. Cost data for the buildings have been relatively scarce, but preliminary results indicate that it is possible to build an energy-efficient commercial building within the same range of costs as for conventional structures.

33116 **Peak demand savings from daylighting in commercial buildings.** Selkowitz, S.; Arasteh, D.; Johnson, R. (Energy Efficient Buildings Program, Lawrence Berkeley Lab.). pp D243-D257 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—). Contract AC03-76SF00098.

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

The authors use an hour-by-hour energy simulation model (DOE-2.1B) to evaluate peak demand components and net effects in daylighted and nondaylighted buildings. More than 5000 parametric simulations were generated for prototypical office building modules containing both horizontal and vertical glazing, and located in 16 U.S. cities. From these simulations they draw conclusions about the effects of daylighting on peak demand for a range of climate types, orientations, fenestration areas, glazing shading coefficients and visible transmittances, U-values, lighting power densities, and lighting control strategies. Results for Los Angeles are briefly compared to results for the climatic extremes of Lake Charles, Louisiana (cooling-dominated) and Madison, Wisconsin (heating-dominated), and then discussed in detail.

33117 **Analysis of daylighting as a conservation strategy in hot climates: The development of a daylighting analysis tool for Singapore.** Levine, M.D.; Turiel, I.; Curtis, R. (Lawrence Berkeley Lab.). pp D217-D242 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—). Contract AC03-76SF00098.

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

The use of daylighting- integration of window and lighting systems in buildings- has the potential to substantially reduce energy use in a highly cost-effective manner. This conservation strategy is particularly suitable for hot, sunny climates such as Singapore. This paper represents a detailed assessment of effects of daylighting on energy use in Singapore. It carries the analysis to the point of development of a tool that has the potential for greatly simplifying the calculational procedures for evaluating daylighting. A large number of computer simulations using the DOE-2 computer code have formed the data base from which an approach has been developed that allows results of the energy analysis to be generalized from one building to another. Singapore is used as a test case, with the intent to apply the approach to other locations in the future.

33118 **Commercial building cogeneration opportunities.** Eto, J.H. (Lawrence Berkeley Lab.). pp D203-D216 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—). Contract AC03-76SF00098.

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

The technical and economic characteristics of a successful cogeneration system can be easily outlined; analysis of the opportunities for such systems in commercial buildings, however, is complicated by the number of interdependent trade-offs that must be made in any given application. The DOE-2.1 building energy analysis tool is used to analyze the returns to cogeneration systems for two building types located in five US cities. For these systems, the effects of system sizing and operating strategies are examined using actual rate schedules. The authors conclude that cogeneration is best thought of as fuel-switching strategy and that, in this context, the driving force for cogeneration opportunities in commercial buildings is the levels and relative prices of the fuel and the electricity that are being substituted.

33119 **Measured results of energy conservation retrofits in non-residential buildings: An update of the BECA-CR data base.** Gardiner, B.L.; Piette, M.A.; Harris, J.P. (Lawrence Berkeley Lab.). pp D30-D48 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—). Contract AC03-76SF00098.

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

Energy consumption data have been compiled for over 300 commercial buildings that have been retrofitted with energy conservation measures. The distribution of energy savings is examined for the data set as a whole and for subsets by building type. For the 94 percent of buildings that saved site energy, median savings are 30.8 kBtu/ft/sup 2/-year (350 MJ/m/sup 2/-year). The median percent reduction is 24.6 percent. Cost-effectiveness indicators are evaluated for those buildings with retrofit cost data. The median retrofit cost is $.40/ft/sup 2/ ($4.30/m/sup 2/) in 1983 dollars. For buildings with a series of retrofits and operating changes the authors explore simple time-trend analyses as an alternative to a pre/post model. They discuss problems of correcting energy consumption data for changes in weather, occupancy, process loads, and other factors. Significant gaps in the data base are identified, along with suggested steps for dealing with them.

33120 **An investigation into quantifying the contribution of wood stoves to space heating energy use.** Oliver, T.; Peach, H.G.; Modera, M. (Bonneville Power Administration). pp I260-I273 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

Wood stoves have become a relatively prevalent source of space-heating energy in residences in the Pacific Northwest. The impact of wood stoves on conservation savings is potentially very large. However, to date the ability to monitor the contribution of wood stoves toward space-heating needs of a particular residence has been limited to measurements of the amount of wood burned, guesstimates of the relative efficiency of various wood stove makes, and guesses as to the relative BTU content of various types of wood. This method has left much to be desired. Within the Hood River Conservation Project (HRCP), identifying the contribution of wood stoves both before and after insulation retrofit became very important once the high incidence of wood stoves was fully known. Constrained by limited data channels with which to collect information on the performance on the building and heating equipment, BPA contracted with Lawrence Berkely Laboratories and Shelton Energy Research to attempt to identify a means of tracking the BTU contribution of the wood stove to space heating using only one data channel. This paper describes the need for this research, the means by which the research was conducted, and finally the results.

33121 **Energy conservation through effective building control; Closing the feedback loop.** Warren, M.L. (Applied Science Div., Lawrence Berkeley Lab.). pp C268-C275 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

The application of innovative design and modern computer-based HVAC controls presents many opportunities for energy conservation in both new and older commercial buildings. New computer technology is rapidly entering the market place to help control energy use. Many things are needed for successful energy-efficient building operation: good design of the building, the HVAC system, and the controls; installation during construction of the system and controls as designed; careful commissioning to bring the building to full operational status; and education of operation and maintenance personnel on how the building should be controlled so that they can refine and improve the building operation. Traditionally, there have been two major feedback mechanisms in the operation of a commercial building: the occupants complain to the maintenance personnel about comfort conditions; and management, who pays the energy bills, complains to the maintenance personnel about the cost.

33122 **Energy effects of electric lighting control alternatives in response to daylighting.** Andersson, B.; Adegran, M.; Webster, T.; Place, W.; Kammerud, R.; Albrand, P. (Passive Research and Development Group). pp D165-D179 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

Results are presented from a study of south facing roof apertures on two buildings from the U. S. Department of Energy's Non-Residential Experimental Passive Buildings Program. The study was planned to investigate the effectiveness of manual control of the electric lighting system in the buildings, and determine its effects on the heating, cooling, and lighting energy consumption of small daylit non-residential buildings. Data was taken from physical models of the two buildings and from the buildings themselves. The building energy analysis program BLAST** was used for the energy analysis of the buildings. Results provide quantitative information on the performance of a variety of electric lighting control strategies in response to natural lighting, including continuous dimming, on/off switching, and the manual control currently in use in the buildings. In both buildings, manual control has provided similar or better energy performance than various automatic control strategies. Factors contributing to this situation are discussed. The daylighting strategies have also shown substantial energy savings over similar, non-daylit buildings.

33123 **Logic diagram graphically represents control system.** Ng, W. (Lawrence Radiation Lab., Univ. of California, Livermore, CA). pp 294-303 of Industrial energy manager's sourcebook. Koral, R.L. Lilburn, GA; The Fairmont Press Inc. (1981).

There are several advantages in using the logic diagram. It is a more compact and simple way to show functional and interlocking relationships. It is a useful design tool because it exposes errors arising from conflicting inputs and outputs. It unifies the control subsystems and eliminates duplication or incomplete sequences of operation. It provides a common language in which the various disciplines can communicate. Finally, the logic diagram can be a very useful addition to the techniques presently employed by mechanical and electrical designers. It might also prove to be of value in oper-

ating manuals where overall system input/output characteristics are of greatest interest.

3202 Transportation

33124 (PB—87-160701/XAB) Transit perspectives to the year 2000: possible consequences of doing nothing. Final report. Putman, S.H. (Pennsylvania Univ., Philadelphia (USA). Dept. of City and Regional Planning). Oct 1986. 48p. NTIS, PC A03/MF A01.

The purpose of the study was to examine some often-ignored indirect effects of reduction or elimination of transit services. The study made use of computer models of transportation and land-use interactions to make an initial assessment of the potential scale of these often-overlooked effects. The results of this preliminary study show these effects increase roadway congestion and travel costs produce substantial declines in economic activities in corridors formerly served by the eliminated transit services.

33125 (PB—87-161154/XAB) Park-and-ride facilities: guidelines for planning design and operation. Final report, September 1984-January 1986. Bowler, C.E.; Noel, E.C.; Peterson, R.; Christiansen, D. (Daniel Consultants, Inc., Columbia, MD (USA)). Jan 1986. 142p. NTIS, PC A07/MF A01.

The document includes the organizational, legal, and administrative aspects of implementing park-and-ride programs, personal and transportation characteristics of park-and-ride users throughout the United States, demand-estimation techniques, factors to be considered in selecting park-and-ride sites, roadway interface with park-and-ride lots, internal design elements for lots, environmental considerations, leasing, marketing, and facility operations.

33126 (PB—87-170148/XAB) Green Bay transit cost-allocation study for the Green Bay urbanized area. Final report. Kolb, R. (Brown County Planning Commission, Green Bay, WI (USA)). Aug 1986. 42p. NTIS, PC A03/MF A01.

The purpose of this study is to analyze the current transit cost-sharing formulas between Green Bay and the urban municipalities in terms of both operating and capital expenditures. The study report includes a detailed analysis of federal, state, and local operating and capital funding formulas and expenditures for the Green Bay Transit System from the 1974 public takeover to 1986. A survey of medium-sized public transit systems in Wisconsin was conducted in terms of local cost-sharing formulas and service contracts. Study recommendations include a new depreciation surcharge for capital expenditures and written service contracts between Green Bay and the other municipalities.

3203 Industry And Agriculture

REFER ALSO TO CITATION(S) 32474, 32474, 32500, 32612, 32614, 33118

33127 (DOE/ID/12583—1) Optimum heat pump placement in industrial processes: Final report. (TENSA Services, Houston, TX (USA)). Mar 1987. Contract AC07-85ID12583. 396p. NTIS, PC A17/MF A01; 1; GPO Dep. File Number DE87009626.

A study was carried out on the optimum placement of heat pumps in industrial processes. Ten processes from a variety of industrial sectors were selected from a total of 26 candidates and were analyzed for optimal heat pump placement using the methods of pinch technology. This procedure provides a systematic and thermodynamically consistent means of evaluating heat pump applications and the savings they yield in terms of overall process energy usage. Pinch analysis has been used to identify and quantify opportunities for energy savings by heat integration, heat and power integration, and distillation system modifications as well as heat pumping. Numerous potential applications were identified for current heat pump systems and considerable scope was also found for possible advanced heat pump technologies. Considerable additional benefit could be derived from advanced heat pumps capable of economically acceptable performance with temperature lifts up to about 150°F at delivery temperatures of around 350°F. The scope for replication of the heat pumping options identified in this study was estimated. This evaluation indicated that the total potential for energy savings nationally in the ten processes studied is about 32.9 x 10^{12} Btu/year or about 10% of the current energy usage.

33128 (EPRI-NP—4916) Lubrication guide: Final report. Bolt, R.O.; Carroll, J.G. (Bolt (Robert O.), San Rafael, CA (USA); Electric Power Research Inst., Palo Alto, CA (USA)). Jan 1987. 12p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920374.

This wall chart outlines for each nuclear power plant application suitable lubricants and their operating limits with respect to temperature and radiation. It also addresses: lubricant stress, shelf life, compatibility, intermittent use, "trouble shooting" and lubricant testing. It is intended for use by maintenance and engineering personnel.

33129 (PB—87-173811/XAB) Background information document for the development of regulations to control the burning of hazardous wastes in boilers and industrial furnaces. (Engineering-Science, Inc., Fairfax, VA (USA)). Jan 1987. 645p. NTIS, PC PC E99.

Set includes PB—87-173829 through PB—87-173845.

33130 (PB—87-173829/XAB) Background information document for the development of regulations to control the burning of hazardous wastes in boilers and industrial furnaces. Volume 1. Industrial boilers. Draft report. (Engineering-Science, Inc., Fairfax, VA (USA)). Jan 1987. 220p. NTIS, PC A10/MF A01.

See also Volume 2, PB—87-173837; Portions of this document are not fully legible; Also available in set of 3 reports PC E99, PB—87-173811.

The background information document summarizes the Waste Management Division's studies in the development of proposed regulations for the burning of hazardous waste in boilers. The report includes a characterization of industrial boilers that have a potential for burning hazardous waste as well as a summary of test data and test methods used in determining the emissions from these devices when burning hazardous waste. Also included in the report is a characterization of various hazardous-waste streams from various data sources, quantities of hazardous waste burned in boilers and furnaces, modifications to boilers systems to burn hazardous waste, and various cost elements needed for the Regulatory Impact Analysis.

33131 (PB—87-173837/XAB) Background information document for the development of regulations to control the burning of hazardous wastes in boilers and industrial furnaces. Volume 2. Industrial furnaces. Draft report. (Engineering-Science, Inc., Fairfax, VA (USA)). Jan 1987. 162p. NTIS, PC A08/MF A01.

See also Volume 1, PB—87-173829, and Volume 3, PB—87-173845; Also available in set of 3 reports PC E99, PB—87-173811.

The report summarizes the Waste Management Division's studies for the development of regulations for burning hazardous waste in industrial furnaces. The report includes a characterization of the industrial furnaces which have a capability for burning hazardous waste. The furnaces addressed are cement kilns (wet and dry processes), lines kilns, light-weight aggregate kilns, blast furnaces, open hearth furnaces, sulfuric acid recovery furnaces, and asphalt concrete plants. The report also includes a summary of test data and methods used in determining both organic and inorganic emissions from these devices. The destruction and removal efficiencies of various organic compounds are also determined based on actual test results. Finally, cost elements needed for the Regulatory Impact Analysis are also given.

3206 Municipalities And Community Systems

REFER ALSO TO CITATION(S) 32614

33132 **Regulatory factors affecting the financial impact of conservation programs on utilities.** Kahn, E.; Pignone, C.; Eto, J.; Mc Mahon, J.; Levine, M. (Lawrence Berkeley Lab.). pp I144-I159 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—).

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

Conservation programs affect utility earnings through specific rate-making procedures. In this paper the authors simulate the effect of exogenous conservation programs on the earnings of Detroit Edison (DE) and Pacific Gas and Electric (P.G.&E.). Revenue losses associated with conservation programs are estimated on a rate schedule level using specific tariff structures and sales frequency distributions. The benefits of conservation are avoided fuel and capacity costs. These are estimated using simulations of utility reliability and production costs. Since both DE and P.G.&E. have inverted residential rate schedule, they expect revenue losses to exceed avoided fuel costs. Revenue lost is disproportionately in the top (highest price) rate tier. This price is usually above marginal fuel cost, even for P.G.&E., where the marginal fuel is often oil and gas. Revenue loss net of avoided fuel is greater for DE than P.G.&E. because DE has low marginal costs and a steeply inverted rate schedule.

33 ADVANCED AUTOMOTIVE PROPULSION SYSTEMS

33133 **(N—87-17849) Space transportation booster engine (STBE) configuration study. Quarterly review report.** (Rockwell International Corp., Canoga Park, CA (USA)). Sep 1986. 374p. (NASA-CR—178941; NAS—1.26:178941; RI/RD-BD—86-149; QR—2). NTIS, PC A16/MF A01.

The overall objective of this Space Transportation Booster Engine (STBE) study is to identify candidate engine configurations which enhance vehicle performance and provide operational flexibility at low cost. The specific objectives are as follows: (1) to identify and evaluate candidate LOX/HC engine configurations for the Advanced Space Transportation System for an early 1995 IOC and a late 2000 IOC; (2) to select one optimum engine for each time period; 3) to prepare a conceptual design for each configuration; (4) to develop a technology plan for the 2000 IOC engine; and, (5) to prepare preliminary programmatic planning and analysis for the 1995 IOC engine.

3301 Internal Combustion Engines

REFER ALSO TO CITATION(S) 33135

33134 **(UCRL—96438) A study of the compression ignition of n-butane in an internal combustion engine.** Green, R.M.; Cernansky, N.P.; Pitz, W.J.; Westbrook, C.K. (Sandia National Labs., Livermore, CA (USA); Drexel Univ., Philadelphia, PA (USA); Lawrence Livermore National Lab., CA (USA)). 31 Mar 1987. Contract W-7405-ENG-48. 24p. (CONF-870484—3). NTIS, PC A02/MF A01; GPO Dep. File Number DE87008842.

From Western states section/the Combustion Institute spring meeting; Provo, UT, USA (6 Apr 1987).

The chemical aspects of the compression ignition of n-butane experimentally in a spark ignition engine have been studied, and theoretical studies using computer simulations with a detailed chemical kinetic mechanism have been performed. The results of these studies demonstrated the effect of initial charge composition on autoignition. Experimentally, when the initial charge consisted of 80% fresh charge and 20% recycled products of combustion, autoignition was inhibited. On the other hand, charging with 80% fresh charge and 20% partial oxidation products from a prior non-fired cycle resulted in enhanced preignition reactions (with the associated heat release and temperature increase) and autoignition. The detailed kinetic model was assessed as to how well it could predict the autoignition. The model was modified to better simulate the experimental observations. Chemical preconditioning of the fuel-air charge was assessed as to effect upon the autoignition process.

3302 External Combustion Engines

REFER ALSO TO CITATION(S) 33135

3308 Alternative Fuels

REFER ALSO TO CITATION(S) 32449

33135 **(DOE/CE/50075—H1) Transportation fuels and engines for optimum energy utilization: An assessment of energy consumption from resources through end use: Final report, Volume 1, August 1985 for the project, Technical assessment of future engines and alternative fuels.** Thomas, R.L.; Cornell, J.J. (American Inst. of Chemical Engineers Research Center for Energy and Engineering, Inc., Washington, DC). Aug 1985. Contract AC01-84CE50075. 89p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE87010333.

This study was initiated to investigate the potential for improving the resource utilization efficiency in the manufacture and end-use of fuels for transportation. While emphasis is placed on the development of fuels from coal and oil shale and on the engine technologies most suitable for those fuels, petroleum-derived fuels are considered as well. A necessary part of this study was to develop information about the energy efficiency of various steps of fuel processing, both with synthetic fuels and petroleum. The configurations of synthetic fuel processes and petroleum refineries are, of course, seemingly endless in number, so, in order to keep the study at a manageable and affordable scope, only a very limited number of synthetic fuel processes were investigated in detail and only major upgrading process operations were included.

35 ARMS CONTROL

33136 **Dangers of limited SDI.** Marsh, G.E. (Argonne National Lab., IL). *Bulletin of the Atomic Scientists;* 43: No. 2, 13-14(Mar 1987).

Recent efforts to redefine the Strategic Defense Initiative (SDI) are mostly aimed at building support for a system to defend US land-based missiles. This is thought to be a more feasible goal than President Reagan's dream of an impregnable shield to defend the US population against ballistic missiles. But a feasible idea is not necessarily a good one. While chasing the population-defense fantasy would destroy the existing arms control regime and waste the national treasure of money and talent, defending land-based missiles would be dangerous and destabilizing. Defense Secretary Caspar Weinberger held fast to the idea of population defense in January, when he told the Senate Armed Services Committee that even early deployments of SDI systems that could be developed in the near future should be the first phase of a system that would protect the continent. But such statements may reflect the administration's determination to do away with the 1972 Anti-Ballistic Missile Treaty more than its belief that population defense is a reasonable goal. The author notes that, to those longstanding problems of defense decision making, they must now add the pressures of SDI. Furthermore, whatever the motives of those who advocate redirecting SDI, it is clear that concerns about the vulnerability of land-based missiles could be addressed in more sensible ways. 5 references.

33137 **Defense: Retaliation or protection.** Teller, E. (Lawrence Livermore National Lab.). pp 102-116 of Arms control: Myth versus reality. Staar, R.F. Stanford, CA; Hoover Institute Press (1984).

For more than two decades, four statements have been the implicit basis for US Defense Policy: Nuclear bombs produce total destruction. Prevention of total destruction requires retaliatory deterrence. Retaliatory destructiveness necessitates arms limitations. Arms treaties lessen the danger of nuclear war. Yet each is flawed. Policies once set in motion seem to acquire their own momentum. Breaking out of the fatal circle of these conclusions - in spite of all the evidence of their falsity - will not be easy. This essay offers a series of questions rather than clear, unambiguous answers. The questions are meant to raise some long overdue doubt about assumptions that affect the survival of the United States.

3503 Verification

REFER ALSO TO CITATION(S) 33649, 33650

36 MATERIALS

REFER ALSO TO CITATION(S) 33029

3601 Metals And Alloys

REFER ALSO TO CITATION(S) 32471, 32740, 32746, 32746, 32748, 32752, 32753, 32753, 32754, 32761, 32762, 32763, 32764, 32765, 32766, 32767, 32768, 32769, 32770, 32771, 32772, 32774, 32775, 32776, 32777, 32778, 32779, 32780, 32781, 32782, 32783, 32784, 32786, 32787, 32788, 32789, 32790, 32791, 32793, 32806, 32806, 32838, 32838, 32839, 32841, 32842, 32842, 32842, 32842, 32843, 32880, 32953, 32994, 33018, 33055, 33187, 33257, 33387, 33398, 33398, 33399, 33400, 33401, 33402, 33406, 33406, 33407, 33410, 33435, 33436, 34376, 34377, 34400, 34441

33138 (CONF-870636—11) Two-bar thermal ratchetting of annealed 2.25Cr-1Mo steel. Swindeman, R.W.; Robinson, D.N. (Oak Ridge National Lab., TN (USA); Akron Univ., OH (USA). Dept. of Civil Engineering). 1987. Contract AC05-84OR21400. 9p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87008795.

From 5. national congress on pressure vessels and piping; San Diego, CA, USA (28 Jun 1987).

Annealed 2.25Cr-1Mo steel was examined under isothermal and thermal ratcheting conditions. Peak temperatures were in the range 454 to 538°C. At the lower temperatures and in the absence of long hold time cyclic hardening occurred. At higher temperatures ratcheting rates in two-bar experiments were approximately constant. Recovery of the yield strength during the hold period at the peak temperature was thought to be the most significant factor controlling the ratcheting.

33139 (CONF-8705103—4) Development of Fe_3Al-based aluminides. McKamey, C.G.; Liu, C.T.; David, S.A.; Horton, J.A.; Cathcart, J.V. (Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 14p. NTIS, PC A02/MF A01; GPO Dep. File Number DE87010019.

From Fossil energy materials program conference; Oak Ridge, TN, USA (19 May 1987).

Iron aluminides based on Fe_3Al possess many attractive properties for structural use. However, limited ductility at ambient temperatures and a sharp drop in strength above 600°C restrict their use as structural materials. The goal of the present study is to develop Fe_3Al-based aluminides with optimum combinations of strength, ductility, and corrosion resistance for use as hot components in advanced fossil energy conversion systems. From a study of the properties of alloys of 24 to 30 at. % Al, it has been determined that the most promising alloy for further development is Fe-28 at. % Al. A discussion of the effect of aluminum concentration on mechanical properties is included in this paper. Initially, 0.5 wt % TiB_2 was added for grain refinement. It has since been determined that these precipitates are deleterious to the weldability, and for future alloy development they will not be added. Alloy additions have been shown to improve both the high-temperature strength and room-temperature ductility. Results of weldability and tensile and creep tests, as well as the present status of oxidation and aqueous corrosion tests, are reported. 17 refs., 7 figs., 3 tabs.

33140 (DOE/ER/45066—T3) The role of composition and microstructure gradients on weld metal properties and behavior. Olson, D.L.; Matlock, D.K. (Colorado School of Mines, Golden (USA). Center for Welding Research). Nov 1986. Contract FG02-84ER45066. 45p. NTIS, PC A03/MF A01; GPO Dep. File Number DE87010407.

The effects of weld metal compositional and microstructural gradients on phase transformations, microstructural stability, and mechanical properties are considered from a fundamental basis in weld metal alloys which are primarily austenitic (e.g., stainless steels). Models which incorporate compositional gradients are developed to predict the resulting weld metal properties. The mechanical properties of weld metals are modeled based on composite theory in which individual weld metal zones are considered as discrete elements within a composite structure.

33141 (DOE/ER/45116—T2) Grain boundaries: Final report, June 16, 1984-June 15, 1987. Balluffi, R.W.; Bristowe, P.D. (Massachusetts Inst. of Tech., Cambridge (USA). Dept. of Materials Science and Engineering). 1987. Contract FG02-84ER45116. 27p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87010246.

During the three-year period coming to a close on June 15, 1987, we have conducted a relatively broad investigation of the structure and properties of grain boundaries on a basic level. The work mainly consisted of a combined experimental and computer simulation attack on the problem of determining the atomic structure and corresponding properties of high-angle grain boundaries in metals. The experimental work has relied heavily on techniques developed for producing thin film specimens containing planar grain boundaries of predetermined and controlled geometry. Studies of the atomistic and dislocation structures of these boundaries have been carried out using electron microscopy in the diffraction, diffraction contrast and lattice imaging modes. Of particular interest have been experiments aimed at deciding questions such as "to what extent are grain boundaries ordered structures?" and "to what extent can grain boundary structures be described by dislocation and structural unit models?". Efforts have been made to measure relative grain boundary energies. The computer simulation work has involved both molecular statics and molecular dynamics calculations using pair potentials and more sophisticated ab initio methods. Emphasis has been on calculating boundary structures and energies in situations where the results can be compared with experiments. Efforts have been made to determine whether the calculated results fit dislocation and structural unit models.

33142 (DOE/ER/45253—1) Fundamental optical studies of competitive adsorption and thin film phenomena: Progress report for period July 1, 1986-June 30, 1987. Furtak, T.E. (Colorado School of Mines, Golden (USA). Dept. of Physics). Apr 1987. Contract FG02-86ER45253. 14p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010083.

The program has provided insight into the mechanisms of surface-enhanced Raman scattering and optical second harmonic generation. New information was also obtained on the electrolyte-metal interface, particularly with regard to the role of chloride ions. The active site was identified in surface enhanced Raman scattering from silver substrates. It was shown that Ag_4^+, stabilized by low temperature or by coadsorption provide specific enhancement, caused by resonance within the silver cluster. Other experiments showed that local field effects dominate the shift of vibrational energy with applied potential in the Ag-Cl system. Several forms of adsorbed chloride were identified. Some are associated with the surface Raman active site stabilization and others represent "ordinary" adsorbed chloride. Optical second harmonic generation studies on underpotential deposited metal films on single crystal samples have shown that some overlayers (Cu, Zn, Cd) demonstrate intrinsic resonance related to the electronic structure of the layer. Other overlayers (Tl, Bi) modify the electron dynamics or density within the substrate. Information has been obtained about the growth sequence for Cu on Ag.

33143 **(DP-MS—86-166) Residual stresses at pinch welds in small stainless steel tubes.** Mosley, W.C. (Savannah River Lab., Aiken, SC (USA)). 1987. Contract AC09-76SR00001. 6p. (CONF-8704128—1). NTIS, PC A02. File Number DE87010186.

From Conference on residual stress in design, process, and materials; Cincinnati, OH, USA (27 Apr 1987).

Stress corrosion cracking of pinch-welded Type 304L stainless steel tubes has been used to determine the locations and magnitudes of tensile residual stresses. Cracking severity, a measure of the extent of tensile stresses above a threshold level, has been correlated with welding parameters and annealing to define conditions that minimize the possibility of environment-assisted slow crack growth on the tube interior. Welding with low current, low electrode force and no restraint, and laser annealing after welding were found to minimize interior stress corrosion cracking at welds in cold drawn tubes. Preliminary work with annealed tubes indicates that pinch welding parameters influence tensile stresses differently.

33144 **(FEI—1742) Influence of mechanical stresses on radiation-induced swelling of metals.** Bagdinov, V.G.; Lebedev, S.Ya. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.). 1985. 16p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702264.

Influence of external tensile stress (0-80 MPa) on swelling, concentration and mean diameter of voids in nickel is studied. Irradiation was carried out with 1 MeV nitrogen ions, radiation dose being upto 100 d/atom, the radiation temperature range (450-650) deg C. Electron-microscopic investigations displayed the stress noticeable influence on formation of the investigated material radiation-induced microstructure. The void concentration and swelling dependencies on the applied stress is nonmonotonic. The stresses at which these dependencies get a maximum are within the range of yield strength and displace to by the low values with radiation temperature growth. 26 references, 3 figures, 2 tables.

33145 **(FhG-W—12/85) Numerical investigations of the dynamic behaviour of the DCB sample.** Stoeckl, H. (Fraunhofer-Institut fuer Werkstoffmechanik, Freiburg im Breisgau (Germany, F.R.)). Nov 1985. 32p. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE87751917.

Experience with the wedge-loaded double cantilever beam (DCB) sample has shown that a reliable numerical simulation of measurements of the stress intensity factor is made very difficult. One tries to predict the effects associated with the occurring complications quantitatively and to interpret the dynamic behaviour of the sample as the effects of various waveforms. The problem of stability of crack propagation is discussed using a criterion provided by Cotterell. With 17 figs., 7 refs.

33146 **(IAE—4119/4) Calculation technique of tritium and helium production in some materials of nuclear reactors.** Kompaniets, G.V.; Nosov, V.I.; Polyakov, D.N. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1985. 15p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702266.

Problem of tritium and helium production in neutron interaction with boron and beryllium nuclei is considered. Necessary balance differential equations are written down, their exact solutions are given and approximated calculated relations permitting to estimate values of concentrations of forming tritium and helium nuclei with acceptable degree of accuracy are derived. 16 references, 2 figures.

33147 **(IAE—4175/10) Effect of heavy and light impurity atoms of Pb and Be and amorphization on high temperature specific heat of Mg or Zr based alloys.** Panova, G.Kh.; Chernoplekov, N.A.; Shikov, A.A.; Kemen', T.; Fogarashi, B.; Tsiraki, A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1985. 17p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702267.

Specific heat of superconducting $Mg_{70}Zn_{30}$, $(Mg_{70}Zn_{30})_{88}Pb_{12}$, $(Zr_{72}Rh_{28})_{93}Be_7$ and Zr_3Cu systems in amorphous and metastable crystalline states is measured within 100-700 K temperature range. Debye temperature Θ/sub HT/, coefficients of electron specific heat γ/sub HT/ and anharmonicity parameter A are determined on the basis of temperature dependence of high temperature specific heat. Approximated oscillation spectra of the investigated systems are restored from a set of experimental data according to low- and high temperature specific heat. 16 references, 6 figures, 4 tables.

33148 **(IAE—4192/4) Mathemtical model of anisotropic creep of materials with displacing and expanding creep potential.** Karpunin, N.I.; Kushchuk, S.V.; Tutnov, A.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1985. 12p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702268.

A brief review of existing creep theories is given. A mathematical model of anisotropic creep of material with displacing and expanding creep potential is developed. Description of experimental methods to determine functions and constants for the given material with the developed model application is presented. 3 references.

33149 **(IAE—4211/2) Magnetic structure heterogeneity in $Fe_{80}B_{20}$ amorphous alloy.** Dudkin, A.Yu.; Suetin, V.A.; Cheremisin, S.M. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1985. 5p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702269.

Measurements of ^{57}Fe nuclear gamma-resonance spectra in the samples of $Fe_{80}B_{20}$ amorphous 0.1x0.5 mm^2 band are made. Considerable changes of sample magnetic anisotropy are registered at the distances of — 0.1 mm. Magnetization component, perpendicular to the band plane, increases in the areas of disturbance of the band heat contact with a cooling disk during quenching. The results are compared to formation models for domain structure and quenching stresses in amorphous alloys with strong magnetostriction. 9 references, 4 figures.

33150 **(IAEA-R—3102-F) In-pile loop experiments in water chemistry and corrosion. Final report for the period 1 May 1982-30 April 1986.** Kysela, J. (International Atomic Energy Agency, Vienna (Austria)). Sep 1986. 77p. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702276.

Results on the study of Zr-1% Nb alloy corrosion, in out-of and in-pile loops simulating the working conditions of the VVER-440 reactor (Soviet, PWR type), covered the time period May 1982-April 1986 were reported, as well as, results on transport and filtration of corrosion products. Methods and techniques used in the study included remote measurement of corrosion rate by polarizing resistance, out-of-pile loop at the temperature 350 deg. C, pressure 19 MPa, circulation 20 kgs/h and in-pile water loop with constant flow rate 10,000 kgs/h, pressure 16 MPa, temperature 330 deg. C and neutron flux $7x10^{13}$ $n/cm^2.s$. It was shown that solid suspended particles with chemical composition corresponding most frequently to magnetite or nickelous ferrite, though with non-stoichiometric composition Me/sub x/$^{2+}$ Fe/sub 3-/x^{3+} O_4 were found. Continuous filtration of water by means of electromagnetic filter leads to a decrease of radioactivity of the outer epitactic layer only. Effect of filtration on the inner topotactic layer is negligible. The corrosion rates for the above-mentioned parameters are given. 38 references, 43 figures, 12 tables.

33151 **(INIS-mf—10635) Systems study 'Alternative Entsorgung'. Final report. Technical annex 2. Corrosion investigation on container materials for other fuel disposal techniques.** Luthardt, G. (comp.). (Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.); Deutsche Gesellschaft fuer Wiederaufarbeitung von Kernbrennstoffen m.b.H. (DWK), Hannover (Germany, F.R.); Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). Oct 1984. 105p. (In German). NTIS (US Sales Only), PC A06/MF A01. File Number DE87751911.

The investigations were carried out in a total of 8 different binary to quinary salt solutions at working temperatures of 150/sup 0/C, 100/sup 0/C and 95/sup 0/C. The exposure times were 0.5, 1,

3, 6, 10, 14 and 18 months. The average linear corrosion speed and the standard deviation were determined. Suitable materials were: Hastelloy C4 (No. 2.4610), a composite of graphite/Ni/sub 3/S/sub 2/, TiCode-12 (titanium grade 12), a composite of Hastelloy C4/ Nucerite EL 25, GGG 40.3 (No. 0.7043), X10CrNi6 18 9 (No. 1.4550), and X2CrNiMoN 22 5 (No. 1.4462). The principle of cathodic corrosion protection, which was used for containers manufactured by compound casting shows full effectiveness in the investigations carried out so far.

33152 (INIS-SU—420, pp 155-156) **Thermodynamical description of decomposition in Fe-M-B amorphous alloys.** Tomilin, I.A.; Kaloshkin, S.D. (Moskovskij Inst. Stali i Splavov, USSR). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33153 (INIS-SU—420, pp 163-164) **Melting heat and specific heat of alkaline earth metals in liquid and solid states.** Shpil'rajn, Eh.Eh.; Kagan, D.N.; Ul'yanov, S.N. (AN SSSR, Moscow. Inst. Vysokikh Temperatur). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33154 (INIS-SU—420, pp 157-158) **Enthalpy amd specific heat of titanium and vanadium germanides at high temperatures.** Fesenko, V.V.; Timokhin, V.V.; Fomenko, V.V.; Lyashchenko, A.B.; Kornilova, V.I.; Zakharchenko, E.V. (Kievskij Tekhnologicheskij Inst. Pishchevoj Promyshlennosti, Ukrainian SSR). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33155 (INIS-SU—420, pp 139-140) **Measurement of molybdenum specific heat by pulsed method at high temperatures.** Petrova, I.I. (AN SSSR, Moscow. Inst. Vysokikh Temperatur). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33156 (INIS-SU—420, pp 131-132) **Features of change of thermal properties of praseodymium near α-β transition.** Kurichenko, A.A.; Machaladze, T.E.; Ivliev, A.D.; Khundadze, M.G.; Chachanidze, G.D.; Zinov'ev, V.E. (Sverdlovskij Gornyj Inst., USSR; AN Gruzinskoj SSR, Tbilisi. Inst. Neorganicheskoj Khimii i Ehlektrokhimii). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33157 (KFK—4086) **Determination of the creep mechanisms of the SNR structural material X6CrNi1811 (DIN 1.4948) derived from microstructural investigations.** Gross, R.; Bennek-Kammerichs, B. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Material- und Festkoerperforschung; Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Schneller Brueter). Jan 1987. 84p. (In German). NTIS (US Sales Only), PC A05/ MF A01. File Number DE87751914.

As a supplement for KfK-report 3397 we have studied the structure variations at the grain boundaries in broken creep specimens of stainless steel X6CrNi1811 (DIN 1.4948). The results of this study we have put in relation to the dates of the mechanical creep tests. From this we concluded on the different creep mechanism which are dependent from the test temperature and the test stress. In correlation with the grain boundary gliding we have made interesting observations of the transformation of grain boundary carbides to particles of σ-phase. Because the material structure changes with stresses and temperatures it is very problematic the creep properties to extrapolate to smaller stresses and temperatures as used in the tests.

33158 (LA-UR—87-1478) **Microstructural aspects of spallation in copper.** Zurek, A.K.; Frantz, C.E. (Los Alamos National Lab., NM (USA)). 1987. Contract W-7405-ENG-36. 9p. (CONF-8705109—2). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010097.

From IMPACT '87; Bremen, F.R. Germany (18 May 1987).

Compressive shock waves result in a specific kind of fracture called a spall. The metallurgical aspects of copper spalling and crack or void initiation sites, the effects of grain size and substructure, and the micromechanical aspects of growth and coalescence have not received the detailed attention that other deformation phenomena have received. The present work was stimulated by the observation that under identical shock loading conditions the spall strength of copper can vary between 0.4 to 2.4 GPa - an unusually wide range - merely as a result of changes in its microstructure. Examples of fracture morphology are presented and possible micromechanics of fracture resulting from different microstructures are discussed. Finally, the implications of these observations on modeling are presented.

33159 (LA-UR—87-1479) **Influence of peak pressure and pulse duration on substructure development and threshold stress measurements in shock-loaded copper.** Gray, G.T. III; Follansbee, P.S. (Los Alamos National Lab., NM (USA)). 1987. Contract W-7405-ENG-36. 9p. (CONF-8705109—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010098.

From IMPACT '87; Bremen, F.R. Germany (18 May 1987).

Based upon a study of the independent variation of peak pressure and pulse duration upon the shock loading response of OFE copper, the following conclusions can be drawn: (1) Increasing peak pressure or pulse duration was found to decrease the observed dislocation cell size and increase the yield strength and (2) the influence of pulse duration is attributed to the influence of reorganization time on the amount of dislocation generation during the rarefaction release.

33160 (LA-UR—87-1715) **Lattice instabilities in heavy fermion superconductors.** Wohlleben, D. (Los Alamos National Lab., NM (USA)). 1987. Contract W-7405-ENG-36. 14p. (CONF-870142—12). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010127.

From 5. international conference on valence fluctuations; Bangalore, India (5 Jan 1987).

This paper shows that while in nonsuperconducting HF systems such as $CeCu_6$, $CeAl_3$ and stoichiometric $CeCu_2Si_2$, the large electronic γ is due to a very narrow f band, in the three HF superconductors UBe_{13}, UPt_3 and nonstochiometric $CeCu_2Si_2$, it is not. The f band of these systems, as measured by their response to magnetic fields in three different ways, is much wider than suggested by the large γ. According to their actual f band width, the HF superconductors belong into the Bantam Fermion class. It is argued that most of the large γ of the HF superconductors is not of electronic origin and that it is instead caused by the precursor of a martensitic phase transition of the lattice or by a crystallographic phase mixture, i.e., that it is due to the displacive degrees of freedom. This suggests that the superconductivity of all three HF superconductors is caused by some special, low energy phonons rather than by a narrow f band. 52 refs., 4 figs., 3 tabs.

33161 (MLM—3425) **Chemistry of glass-ceramic to metal bonding for header applications: III. Treatment of Inconel 718 to eliminate hot cracking during laser welding.** Moddeman, W.E.; Jones, W.H.; Koeller, T.L.; Craven, S.M.; Kramer, D.P. (Monsanto Research Corp., Miamisburg, OH (USA). Mound). 24 Apr 1987. Contract AC04-76DP00053. 24p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010639.

A study was conducted to determine the weldability of Inconel 718 shells. Two pieces of Inconel 718 were welded together with a Hastelloy B-2 filler. The Inconel surface condition was

varied by heat-treating and by using several different cleaning processes. The surface chemistry following each modification was determined by Auger spectroscopy. Each conditioned Inconel hollow cylinder (shell) was also checked for pulsed laser weldability by looking for hot cracking. Abraded and solvent-cleaned Inconel shells were found to have thin surface oxides and were also found to be weldable. Heat-treated shells were shown to have a thick complex oxide layer consisting primarily of chromium, titanium, aluminum, and niobium, and were not found to be weldable. Variations of an "oxide removal" treatment were used and found to be ineffective in removing all of the heat-treated surface oxides. The predominant oxide left after the various removal treatments was a thick aluminum oxide laced with alkali, alkaline earth and nickel oxides, sulfides (or sulfates), and/or chlorides. Inconel shells after being treated by these oxide removal steps and variations were also found not be be laser weldable. This oxide was finally removed by electropolishing, and the resulting surface was found to be crack-free after welding. Auger analysis of fractured surfaces in hot-cracked regions revealed that the surfaces consisted of an oxide similar to that left after the removal steps, but without the aluminum oxide. Thus, it was concluded that hot cracking in heat-treated, oxide-removed Inconel 718 is due to one or all of the following: alkali, alkaline earth and nickel oxides, sulfides (or sulfates), and/or chlorides that accumulate in the cracked area.

33162 (N—87-20055, pp vp) **Plasma interactions and surface/material effects.** Mandel, M.; Chutjian, A.; Hall, W.; Leung, P.; Robinson, P.; Stevens, N. J. Oct 1986. NTIS, PC A20/MF A01. (NASA-CR—180231; JPL-PUB—86-49; NAS—1.26:180231; CONF-8609284—).

From Workshop on space technology plasma issues in 2001; Pasadena, CA, USA (24 Sep 1986).

A discussion on plasma interactions and surface/material effects is summarized. The key issues in this area were: (1) the lack of data on the material properties of common spacecraft surface materials; (2) lack of understanding of the contamination and decontamination processes; and (3) insufficient analytical tools to model synergistic phenomena related to plasma interactions. Without an adequate database of material properties, accurate system performance predictions cannot be made. The interdisciplinary nature of the surface-plasma interactions area makes it difficult to plan and maintain a coherent theoretical and experimental program. The shuttle glow phenomenon is an excellent example of an unanticipated, complex interaction involving synergism between surface and plasma effects. Building an adequate technology base for understanding and predicting surface-plasma interactions will require the coordinated efforts of engineers, chemists, and physicists. An interdisciplinary R and D program should be organized to deal with similar problems that the space systems of the 21st century may encounter.

33163 (NIIAR—17(698)) **Evaluation of corrosion resistance of niobium or vanadium base alloys in sodium through results of reactor and bench tests.** Kazakov, V.A.; Anisimov, Yu.V.; Goncharenko, Yu.D. (Nauchno-Issledovatel'skij Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR)). 1986. 23p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702391.

Tests of niobium and vanadium base alloys are carried out in sodium on the test bench during 1000 h at 400 and 600 deg C and in the BOR-60 primary circuit during 8000 h at 400-600 deg C. Alloy systems with different doping element contents (Nb-W; Nb-V; Nb-Zr-C; V-Ti; V-Cr; V-Ti-Cr; V-Zr-C) as well as multiple-component systems on the base of these alloys are investigated. Considerable difference in results of reactor and bench tests, conditioned by radiation and corrosion damage of metals and by emergence of new effects, resulting from the combined action of damageing factors is revealed. It is shown, that the reason for decreasing service properties of vanadium and niobium base alloy in sodium medium under irradiation leis in the reduction of alloy ductility down to complete embrittlement, which appears together with radiation hardening. Material dissolution in sodium under irradiation is not sufficient. Corrosion resistance of the investigated materials, estimated by corrosion rate, is satisfactory. Minimal changes of properties of niobium alloys (Nb-Zr-C and Nb-W-Zr-C) and vanadium W-Ti-Cr-type alloys are registered. 7 references, 12 figures, 2 tables.

33164 (NUREG/CR—4878) **Analysis of experiments on stainless steel flux welds.** Wilkowski, G.; Ahmad, J.; Brust, F.; Guerrieri, D.; Kramer, G.; Kulhowvick, G.; Landow, M.; Marschall, C.; Nakagaki, M.; Papaspyropoulos, V. (Battelle Columbus Div., OH (USA); Nuclear Regulatory Commission, Washington, DC (USA). Div. of Engineering Safety). Apr 1987. 183p. (BMI--2151). NTIS, PC A09/MF A01 - GPO. File Number TI87900672.

This report describes experimental and analytical efforts to evaluate fracture of stainless steel flux-welded pipe. Seven pipe fracture experiments (four with through-wall circumferential cracks and three with circumferential internal surface cracks) were conducted at 550°F (288°C). Material characterization efforts involved laboratory specimen tests to assess specimen size effects, effects of solution-annealing, and crack-growth behavior in the HAZ, along the fusion line, and in the weld metal. Efforts involved assessing the net-section-collapse analysis, the plastic-zone screening criterion, inherent safety margins in the IWB-3640 flux weld analysis, through-wall-cracked pipe predictive J-estimation schemes for LBB analyses, eta-factor J-R curves calculated from the pipe experiments for comparison to C(T) specimen results, and finite element analysis of C(T) specimens and one pipe experiment. This report also evaluates the technical significance of these results and their significance relative to licensing decisions.

33165 (NUREG/CR—4889) **Zircaloy-4 oxidation at 1300 to 2400°C.** Prater, J.T.; Courtright, E.L. (Pacific Northwest Lab., Richland, WA (USA); Nuclear Regulatory Commission, Washington, DC (USA). Div. of Reactor Systems Safety). Apr 1987. Contract AC06-76RL01830. 37p. (PNL—6166). NTIS, PC A03/MF A01 - GPO. File Number TI87008841.

The oxidation kinetics of Zircaloy-4 in steam have been extended to 2400°C. The ZrO_2 and α-Zr layers display parabolic growth behavior over the entire temperature range studied. A discontinuity in the oxidation kinetics at 1510°C causes rates to increase above those previously established by the Baker-Just relationship. This increase coincides with the tetragonal-to-cubic phase transformation in ZrO/sub 2-x/. No additional discontinuity in the oxide growth rate was observed when the metal phase melted. The effects of temperature gradients were taken into account, and corrected values representative of near-isothermal conditions were computed. Oxide growth was also measured in various steam-hydrogen mixtures at 1565°C and 1815°C. Hydrogen concentrations up to 90 mol% had no effect on oxidation kinetics. The rate-controlling factor appears to be diffusion through the oxide layer. Finally, the oxidation kinetics of prereacted Zircaloy-15 mol% UO_2 were measured at 1400 to 2150°C. The rates were comparable to those obtained for Zircaloy above 1500°C.

33166 (ORNL/SUB—83-47977/01) **Evaluation of 3Cr-1.5Mo steels in a simulated coal conversion environment.** Shaw, B.J. (Westinghouse Research and Development Center, Pittsburgh, PA (USA); Oak Ridge National Lab., TN (USA)). Jan 1987. Contract AC05-84OR21400. 50p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87010223.

Purpose of this study was to evaluate two 3Cr-1.5Mo steels in a simulated coal gasification environment [H_2 + 1% H_2S, 900 psig (6.3 MPa), 600°F (316°C)] and also at room temperature after exposure to this environment. A commercial heat of 2.25Cr-1Mo steel was also tested for comparison. The test techniques included fracture mechanics tests (J/sub Ic/), tensile tests and Charpy impact tests. The 3Cr-1.5Mo-V steel was tempered to three strength levels for the study. The 3Cr-1.5Mo-Ni steel was a weldment and tests were carried out on the base metal, the weld metal and the heat affected zone. Results showed that overall the 2.25Cr-1Mo steel and the low strength 3Cr-1.5Mo-V steel were superior. The high strength 3Cr-1.5Mo-V steel exhibited low resistance to tearing fracture (tearing modulus T ~ 0) at room temperature after temper embrittlement and after exposure to the environment.

33167 (RFP—4007) Processing depleted uranium quad alloy penetrator rods. Bokan, S.L. (Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant). 19 Feb 1987. Contract AC04-76DP03533. 33p. NTIS, PC A03/MF A01; GPO Dep. File Number DE87010346.

Two depleted uranium (DU) quad alloys were cast, extruded and rolled to produce penetrator rods. The two alloy combinations were (1) 1 wt % molybdenum (Mo), 1 wt % niobium (Nb), and 0.75 wt % titanium (Ti); and (2) 1 wt % tantalum (Ta), 1 wt % Nb, and 0.75 wt % Ti. This report covers the processing and results with limited metallographic information available. The two alloys were each vacuum induction melted (VIM) into an 8-in. log, extruded into a 3-in. log, then cut into 4 logs and extruded at 4 different temperatures into 0.8-in. bars. From the 8 conditions (2 alloys, 4 extrusion temperatures each), 10 to 13 16-in. rods were cut for rolling and swaging. Due to cracking problems, the final processing changed from rolling and swaging to limited rolling and heat treating. The contracted work was completed with the delivery of 88 rods to Dr. Zabielski. 28 figs.

33168 (SAND—87-0795) Key curve approach to static and dynamic fracture toughness measurement. Salzbrenner, R. (Sandia National Labs., Albuquerque, NM (USA)). May 1987. Contract AC04-76DP00789. 35p. NTIS, PC A03/MF A01; GPO Dep. File Number DE87010536.

The elastic-plastic fracture toughness of fully ferritic ductile cast iron has been determined at two different loading rates by employing the key curve analysis method. The key curve results are directly compared with values obtained from the multiple specimen method at each rate. Further, the measurement of crack growth resistance by the two methods is compared. The fracture toughness is (within experimental error) unchanged by varying displacement rate from static (5.0×10^{-6} m/sec) to 1.0×10^{-2} m/sec. The slope of the crack growth resistance curve as measured by the key curve method is approximately twice that measured by the multiple specimen technique.

33169 (SAND—87-8206) An evaluation of consumable inserts for gas tungsten arc welding. Chavez, A.E.; Marburger, S.J. (Sandia National Labs., Livermore, CA (USA)). Mar 1987. Contract AC04-76DP00789. 71p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87007899.

This study presents information on the use of consumable inserts to make 100% penetration welds in 304 and modified A286 (designated JBK-75) stainless steels. Current and voltage ranges which produced acceptable welds were found for different combinations of joint preparations and inserts. Three third member insert designs were examined: Type A (AWS Class 1), Type G (AWS Class 3), and Type K (AWS Class 5). One joint design incorporated the configuration of the Type G insert into the root face of the joint (termed an "integral insert"). Joints welded with and without filler wire addition were made for comparison. Metallurgical and radiographic tests were done on all welds. It was found that the consumable insert root pass was comparable to the wire-fed root pass in weld shape and size using the same parameters; it also had additional advantages in ease of use, cleanliness, inspectability and reduced procedure complexity.

33170 (UCRL—93703-Rev.1) Constitutive models used in computer simulation of time-resolved, shock-wave data. Steinberg, D.J. (Lawrence Livermore National Lab., CA (USA)). Apr 1987. Contract W-7405-ENG-48. 9p. (CONF-8705109—3-Rev.1). NTIS, PC A02/MF A01; GPO Dep. File Number DE87008471.

From IMPACT '87; Bremen, F.R. Germany (18 May 1987).

About 15 years ago, we developed a constitutive model for metals applicable at high-strain rates. When this model was first described in the literature, very little time-resolved, shock-wave data were available for peak loading stresses in excess of 10 GPa. This problem has since been rectified. Purpose here is to show how well our model can predict these new data. We compare experimental and calculational velocity-time shock loading and release profiles for Be, U, Ta, Cu, and 1100-O Al.

33171 (UCRL—96127) Solid diffusion subroutine for the NIKE and DYNA finite element codes. Sam, D.D.; Chidester, S.K. (Lawrence Livermore National Lab., CA (USA)). 1987. Contract W-7405-ENG-48. 6p. (CONF-870482—4). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87007323.

From 14. Department of Energy compatibility, aging and service life conference; Amarillo, TX, USA (28 Apr 1987).

A FORTRAN subroutine has been written to predict the time dependent atomic concentrations of any finite element mesh. The purpose is to enhance the capability of the NIKE and DYNA codes to analyze static and dynamic response of solids. The diffusion mechanism incorporated in the subroutine at this point is simple. Each element transfers a user specified percent of matter per unit area to its adjacent elements every time step. Experimental measurements and/or user insight is required to determine these values at this stage in development of the subroutine. We are currently seeking other models to add to the subroutine, thereby increasing the ability of NIKE and DYNA to solve problems where solid diffusion occurs.

33172 Digital acquisition and analysis of acoustic emission signals for crack site initiation studies. Barna, B.A.; Johnson, J.A.; Allemeier, R. (Idaho National Engineering Lab., Idaho Falls). pp 345-351 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—). Contract AC07-76ID01570.

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

In the study of elastic-plastic fracture mechanisms it is necessary to determine accurately the time and location history of crack initiation and to discriminate between the fracture mechanisms of ductile and brittle rupture. In order to accomplish this, a real-time digital acquisition system for analysis of acoustic emissions has been configured, and some preliminary results are described in this paper. The goals for this system are to locate crack initiation sites with an accuracy of 200 μm or better and to respond to events separated in time by less than 100 ms.

33173 Inversion of eddy current data and the reconstruction of flaws. Part I. Acquisition of data. Treece, J.C.; Drynan, J.M.; Nyenhuis, J.A.; Beaman, C.D. (Purdue Univ., West Lafayette, IN). pp 611-617 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—). Contract AC02-83ER80096.

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

The authors have taken eddy current measurements to be used for high-resolution reconstruction of flaws in a stainless steel tube. Magnetic field measurements were made at many frequencies with small sensors in the presence of a practically uniform exciting field. Sensor design and electronics were developed to make the acquisition of large amounts of data feasible. Plots of the magnetic fields were compared with model calculation plots generated by Sabbagh Associates, and were found to show good promise of reconstruction.

33174 Inversion of eddy current data and the reconstruction of flaws. Part 2. Inversion of data. Sabbagh, L.D.; Sabbagh, H.A. (Sabbagh Associates, Inc., Bloomington, IN). pp 619-626 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—). Contract AC02-83ER80096.

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

Their multifrequency reconstruction algorithm is based on a rigorous electromagnetic model for eddy-current interactions with flaws in conducting tubes. The electromagnetic analysis leads to certain integral equations which given the components of the perturbed magnetic induction field in terms of the two-dimensional Fourier transforms of the conductivity distribution of the anoma-

lous region at each of N/sub r/ layers within the cylinder wall. The objective is to invert these equations, i.e., to determine the conductivity distribution, given the measured induction field as input data. The data is acquired by measuring the perturbed induction field at several frequencies, and then writing down an equation for each frequency. In the laboratory experiments they used 25 frequencies, starting at 100 kHz and ending at 5 MHz. The number of layers, N/sub r/, was equal to ten. In their experiments they measure the radial component of the induction field as their input data. This introduces a slight complication in the inversion, because the transfer function that corresponds to the radial field has a zero on the axis (n,0) in Fourier space. This makes it impossible to invert the system. Therefore, they divide the transfer function by jh (analytically, of course) and integrate the data with respect to z. This produces a new, but equivalent, system that does allow inversion along the Fourier axis (m,0).

33175 **Kinetics of zinc deposition on zinc single crystals.** McBreen, J.; Gannon, E. (Dept. of Applied Science, Brookhaven National Lab., Upton, NY). *Journal of the Electrochemical Society;* **133**: No. 10, 2047-2050(Oct 1986). Contract AC02-76CH00016.

The potential step method and scanning electron microscopy were used to investigate zinc deposition on zinc single crystals in high purity 3M ZnCl/sub 2/. Kinetics and morphology are dependent on crystal orientation. Below 20 mV layer type deposits are formed on the basal (0001) plane. Above 20 mV there is nucleation and growth of three dimensional centers. On the plane perpendicular to the basal plane (1120) only layer type growth was observed.

33176 **Role of boron and zirconium in creep deformation of Ni-base single phase alloys at high temperature.** Takeyama, M.; Matsuo, T.; Kikuchi, M.; Tanaka, R. (Oak Ridge National Lab., TN; Tokyo Institute of Technology, Japan; Yokohama National Univ., Japan). pp 9 of Metallurgical Society of AIME. Orlando, FL; AIME (1986). (CONF-861076—).

From Fall meeting of the Metallurgical Society of AIME; Orlando, FL, USA (5 Oct 1986).

Creep deformation has been investigated at 1000 C in high purity Ni-20Cr single phase alloys containing boron and zirconium within the solubility limit. Creep resistance remained essentially unchanged by the addition of boron, while it substantially increased by the addition of zirconium. Unlike the creep resistance, three and ten-fold increase in rupture life were obtained by the additions of boron and zirconium, respectively. The increase in rupture life was attained by the dramatic extension of the tertiary creep sage. Microstructures which led to the longer tertiary stage will be discussed in conjunction with the alloying of boron and zirconium. 9 references.

33177 **Method of beam welding metallic parts together and apparatus for doing same.** Lewandowski, E.F.; Cassidy, D.A.; Sommer, R.G. (to Dept. of Energy). US Patent Application 6-802,874. 29 Nov 1985. 30p. Contract W-31-109-ENG-38. DE87007283 NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87007283.

This method provides for temporarily clamping a metallic piece to one side of a metallic plate while leaving the opposite side of the plate exposed, and providing a heat conductive heat sink body configured to engage the adjacent portions of such one side of the plate and the piece at all regions proximate to but not at the interface between these components. The exposed side of such plate is then subjected to an electron welding beam, in exact registry with but opposite to the piece. The electron welding beam is supplied with adequate energy for penetrating through the plate, across the interface, and into the piece, whereby the electron welding beam produces molten material from both the plate and the piece in the region of the interface. The molten material flows into any interstices that may exist in the interface, and upon cooling solidifies to provide a welded joint between the plate and piece, where the interface was, virtually without any interstices. The heat sink material prevents the molten material from extrucing beyond what was the interface, to provide a clean welded joint. The heat sink body also mechanically holds the plate and piece together prior to the actual welding.

3602 Ceramics, Cermets, And Refractories

REFER ALSO TO CITATION(S) 32661, 32661, 33151, 33311, 33432, 33432, 33433, 34260

33178 **(GA-A—18815) Friction and wear behavior of chromium carbide coatings.** Lindgren, J.R.; Johnson, W.R. (GA Technologies, Inc., San Diego, CA (USA)). Mar 1987. Contract AC03-84SF11962. 31p. (CONF-870388—7). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87010085.

From International conference on metallurgical coatings; San Diego, CA, USA (23 Mar 1987).

Chromium carbides, tungsten carbide, and chromium oxide have been tested and evaluated as coatings to protect high-temperature gas-cooled reactor (HTGR) steam generator and other HTGR components from adhesion, galling associated with sliding wear or from fretting. Tests were performed in commercially-pure helium and in helium doped with various gaseous impurities (H_2, H_2O, CH_4, CO) to simulate the primary coolant of an HTGR. Several types of chromium carbide coatings including Cr_3C_2, Cr_7C_3, and $Cr_{23}C_6$, were tested for wear resistance and resistance to long-term spalling. Tungsten carbide and chromium oxide coatings were tested in sliding wear tests. $Cr_{23}C_6$-NiCr coatings showed the best performance (from 400 to 816°C) whether they were applied by detonation gun or plasma gun spraying methods. The presence of the $Cr_{23}C_6$-NiCr coatings did not affect the creep rupture properties of Alloy 800H substrates at temperatures up to 760°C. Low-cycle fatigue life of similar specimens at 593°C was reduced to 10 to 20% when tested in the 1 to 0.6% strain range.

33179 (INIS-SU—420, pp 165-166) **Temperature dependence of isobar-isothermal potential of glassforming system.** Shul'ts, M.M.; Ushakov, V.M.; Borisova, N.V. (AN SSSR, Leningrad. Inst. Khimii Silikatov). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33180 (INIS-SU—420, pp 151-152) **Enthalpy and phase transitions of zirconium dioxide at high temperatures.** Tarasov, V.D.; Irgashov, Kh.; Ramanauskas, G.R.; Chekhovskoj, V.Ya. (AN SSSR, Moscow. Inst. Vysokikh Temperatur). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33181 (INIS-SU—420, pp 147-148) **Thermodynamic characteristics of cubic boron nitride in the temperature range of 300-1600K.** Solozhenko, V.L.; Chajkovskaya, I.Ya. (AN Ukrainskoj SSR, Kiev. Inst. Sverkhtverdykh Materialov). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33182 (INIS-SU—420, pp 145-146) **High-temperature enthalpy and specific heat of borides of molybdenum-boron system.** Serbova, M.I.; Volovik, L.S.; Kovalevskaya, E.I. (Kievskij Tekhnologicheskij Inst. Pishchevoj Promyshlennosti, Ukrainian SSR). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33183 (INIS-SU—420, pp 143-144) **Effect of order-disorder transformations on specific heat of nonstoichiometric niobium carbide.** Rempel', A.A.; Gusev, A.I. (AN SSSR, Sverdlovsk. Inst. Khimii). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33184 (INIS-SU—420, pp 133-134) **Enthalpy and specific heat of monocrystal SmB/sub 6/ and GdB/sub 6/ at high temperatures.** Muratov, V.B.; Lazorenko, V.I.; Matvienko, A.A. (AN Ukrainskoj SSR, Kiev. Inst. Problem Materialovedeniya). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33185 (N—87-18668) **Mechanical strength and tribological behavior of ion-beam deposited boron nitride films on nonmetallic substrates.** Miyoshi, K.; Buckley, D.H.; Pouch, J.J.; Alterovitz, S.A.; Sliney, H.E. (National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center). 1987. 24p. (NASA-TM—89818; E—3439; NAS—1.15:89818; CONF-870388—8). NTIS, PC A02/MF A01.

From International conference on metallurgical coatings; San Diego, CA, USA (23 Mar 1987).

An investigation was conducted to examine the mechanical strength and tribological properties of boron nitride (BN) films ion-beam deposited on silicon (Si), fused silica (SiO_2), gallium arsenide (GaAs), and indium phosphide (InP) substrates in sliding contact with a diamond pin under a load. The results of the investigation indicate that BN films on nonmetallic substrates, like metal films on metallic substrates, deform elastically and plastically in the interfacial region when in contact with a diamond pin. However, unlike metal films and substrates, BN films on nonmetallic substrates can fracture when they are critically loaded. Not only does the yield pressure (hardness) of Si and SiO_2 substrates increase by a factor of 2 in the presence of a BN film, but the critical load needed to fracture increases as well. The presence of films on the brittle substrates can arrest crack formation. The BN film reduces adhesion and friction in the sliding contact. BN adheres to Si and SiO_2 and forms a good quality film, while it adheres poorly to GaAs and InP. The interfacial adhesive strengths were 1 GPa for a BN film on Si and appreciably higher than 1 GPa for a BN film on SiO_2.

33186 (N—87-18784) **Thermomechanical behavior of plasma-sprayed ZrO_2-Y_2O_3 coatings influenced by plasticity, creep and oxidation.** Padovan, J.; Chung, B.T.F.; Mcdonald, G.E.; Hendricks, R.C. (National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center). 1987. 15p. (NASA-TM—88940; E—3385; NAS—1.15:88940; CONF-870172—1). NTIS, PC A02/MF A01.

From 11. annual conference on composites; Cocoa Beach, FL, USA (18 Jan 1987).

Thermocycling of ceramic-coated turbomachine components produces high thermomechanical stresses that are mitigated by plasticity and creep but aggravated by oxidation, with residual stresses exacerbated by all three. These residual stresses, coupled with the thermocyclic loading, lead to high compressive stresses that cause the coating to spall. A ceramic-coated gas path seal is modeled with consideration given to creep, plasticity, and oxidation. The resulting stresses and possible failure modes are discussed.

33187 (PNL—6144) **Stable attachment of TiB_2-based cathodes for the aluminium industry: Review and recommendation.** Schilling, C.H.; Hagen, D.I.; Hart, P.E. (Pacific Northwest Lab., Richland, WA (USA)). May 1987. Contract AC06-76RL01830. 45p. NTIS, PC A03/MF A01; GPO Dep. File Number DE87010265.

This report summarizes the results of a literature review of methods for applying TiB_2-based cathode materials to the Hall-Heroult process used for the commercial production of aluminum. The report discusses applicable patents, alternative bonding and coating techniques, and developmental research performed by several aluminum companies. Recommendations are given for future directions in retrofitting Hall-Heroult cells with stable TiB_2-based cathode materials.

33188 (SAND—86-2910C) **Preparation of boron-rich refractory semiconductors.** Aselage, T.L. (Sandia National Labs., Albuquerque, NM (USA)). 1987. Contract AC04-76DP00789. 11p. (CONF-870438—17). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010429.

From Spring meeting of the Materials Research Society; Anaheim, CA, USA (21 Apr 1987).

Boron-rich refractory solids based on the rhombohedral structure of α-B exhibit electrical properties that range from a hopping-type semiconductor (boron carbide) to wide bandgap room temperature insulators (the boron pnictides B_6P and B_6As). As such, they are of interest for a variety of high temperature semiconductor applications. Preparation techniques for these unusual materials are reviewed, and new results on the crystal growth of boron carbides and B_6As and on thin film deposition of B_6P are presented.

33189 **Synthesis, structure and superconductivity of single crystals of high-T/sub c La/sub 1.85/Sr/sub 0.15/CuO_4.** Wang, H.H.; Geiser, U.; Thorn, R.J.; Carlson, K.D.; Beno, M.A.; Monaghan, M.R.; Allen, T.J.; Proksch, R.B.; Stupka, D.L.; Kwok, W.K.; Crabtree, G.W. (Argonne National Lab., IL). *Inorganic Chemistry;* **26**: No. 8, 1190-1192(22 Apr 1987).

Single crystals in the La-Ba-Cu-O system (LBCO) have been prepared, and x-ray structural characterization and superconducting properties of the crystals are reported. The superconductivity of the sample was detected by rf penetration depth measurements at 500 kHz. The onset temperature for the superconductivity (Tc) was 8.5 - 9.0 K with a broad transition and a low signal response. These findings indicate that only a small fraction of the sample had bulk superconductivity, and the crystals possess a range of Tc values. 13 references, 1 figure, 1 table.

33190 **Silicon carbide whisker-zirconia reinforced mullite and alumina ceramics.** Becher, P.F.; Tiegs, T.N. (to Dept. of Energy, Washington, DC). US Patent 4,657,877. 14 Apr 1987. Filed date 21 May 1986. vp.

This patent describes a SiC whisker-reinforced ceramic composite characterized by at least one of increased flexural strength and resistance to fracture, comprising: a composite defined by a matrix of mullite or alumina with an adequate concentration of zirconia in a monoclinic phase or a tetragonal phase to provide an increase in at least one of flexural strength and fracture toughness of the SiC whisker-reinforced composite over SiC whisker-reinforced composites provided without the zirconia addition; and with about 5 to 30 vol. % SiC whiskers homogeneously dispersed therein. The SiC whiskers have a mono-crystalline structure and a size range of about 0.6 micrometer in diameter and a length of about 10 to 80 micrometers. The whiskers are characterized in the composite by causing crack deflection and crack bridging and by whisker pull-out from the matrix when the composite is subjected to crackforming stresses.

33191 **Linearization beam-hardening correction method for x-ray computed tomographic imaging of structural ceramics.** Segal, E.; Ellingson, W.A.; Segal, Y.; Zmora, I. (Argonne National Lab., IL). pp 411-419 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—). Contract W-31-109-ENG-38.

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

Computed tomographic (CT) imaging with both monochromatic and polychromatic x-ray sources can be a powerful NDE method for characterization (e.g., measurement of density gradients) as well as flaw detection (e.g., detection of cracks, voids, inclusions) in ceramics. However, the use of polychromatic x-ray sources can cause image artifacts and overall image degradation through beam hardening (BH) effects. For many industrial compo-

nents made of relatively high-density materials, the BH effect is considerably greater than encountered in medial applications, but very little has been done to cope with this problem. Rather, the BH effect is avoided in many industrial CT systems by using monochromatic isotope sources. The main disadvantages of isotope-source CT systems are the low intensity (which leads to longer image data acquisition times) and the stringent safety measures required to protect personnel. The purpose of this paper is to present a linearization BH correction method applicable to the CT examination of ceramic materials with a polychromatic x-ray source.

33192 **WO/sub 3/ thin films for practical electrochromic windows.** Goldner, R.B.; Wong, K.; Foley, G.; Norton, P.; Wamboldt, L.; Seward, G.; Haas, T.; Chapman, R. (Electro-Optics Technology Center, Tufts Univ., Medford, MA 02155). pp 39-42 of Materials and optics for solar energy conversion and advanced lighting technology. Lampert, C.M.; Holly, S. Bellingham, WA; SPIE Society of Photo-Optical Instrumentation Engineers (1986). (CONF-860880—).

From 30. SPIE technical symposium on optics and optoelectronic engineering; San Diego, CA, USA (17 Aug 1986).

This paper shows that practical spectrally-selective transmittance modulation can be achieved with thin (50-100nm) WO/sub 3/ films, and therefore such films should be useful for fabricating electrochromic windows. The transmittance and reflectance modulation results are compared with theoretical predictions. The results indicate an excess intraband absorptance, which is attributed to free electron scattering arising from extended defects.

3606 Other Materials

REFER ALSO TO CITATION(S) 32603, 32625, 32644, 32649, 32669, 32669, 32670, 33236, 33237, 33239, 33240, 33241, 33242, 33243, 33245, 33249, 33274, 33276, 33289, 33291, 33292, 33297, 33303, 33304, 33305, 33308, 33312, 33313, 33316, 33400, 33414, 33620, 34069, 34215, 34227

33193 **(AD-A—178907/2/XAB) Processible boron nitride preceramic polymers. Technical report.** Paciorek, K.J.; Harris, D.H.; Krone-Schmidt, W.; Kratzer, R.H. (Ultrasystems Defense and Space Systems, Inc., Irvine, CA (USA)). 23 Feb 1987. 19p. (TR—4). NTIS, PC A02/MF A01.

Synthesis of B-triamino-N-tris(trimethylsily)borazine from the precursor B-trichloro-N-tris(trimethylsilyl)borazine is reported. Thermal condensations of the two borazines are discussed and mechanisms responsible for the results observed are postulated. A structural arrangement for the preceramic polymer obtained from B-triamino-N-tris(trimethylsilyl)-borazine is proposed. Utilization of the above polymer for fiber manufacture, application as fiber coatings, and coatings in general are described together with the transformations into boron nitride in ammonia atmosphere.

33194 **(BARC—1280) Growth and characterization of $LiNbO_3$ crystals.** Sangeeta; Rajpurkar, M.K.; Kothiyal, G.P. (Bhabha Atomic Research Centre, Bombay (India). Technical Physics and Prototype Engineering Div.). 1985. 31p. NTIS (US Sales Only), PC A03. File Number DE87900810.

Single Crystals of $LiNbO_3$ having maximum dimensions of 20 mm phi and 12 mm length have been grown along <104> direction from melt using Czochralski technique. Some problems in the growth of these crystals have been identified and discussed. Effects of starting charge and annealing were also studied. The crystals have been characterized by the x-ray diffraction, the temperature and frequency dependences of dielectric constant, ac conductivity, etc. The transition temperature has been obtained around 1010°C. The temperature dependence of dc conductivity yielded an activation energy of 2.74 eV. In general, the results were similar to those reported in the literature.

33195 **(BARC—1283) Preparation of mercury cadmium telluride an infrared detector material.** Sahoo, D.; Srikantiah, R.V. (Bhabha Atomic Research Centre, Bombay (India). Technical Physics and Prototype Engineering Div.). 1985. 29p. NTIS (US Sales Only), PC A03. File Number DE87900809.

Mercury cadmium telluride (Hg/sub 1-x/Cd/sub x/Te) has been prepared from its constituent elements for infrared detection in the 8 to 14μm range. The alloy was synthesized for the composition $x = 0.15$ and $x = 0.2$ with the help of a rocking furnace. Crystals were grown from the synthesized alloy by Bridgman-Stockbarger technique. The crucible lowering rate and the temperature gradient at the growth temperature were kept at 0.25 mm/h and 70°C/cm, respectively. Both the synthesis and Bridgman-Stockbarger growth furnaces were specially designed. Grown crystals were characterized for their single crystallinity, surface morphology, density distribution along the growth direction, radial composition profile and conductivity type. The expected result of segregation of CdTe with respect to HgTe during growth has been verified. Crystals grown from the alloy with $x = 0.2$ change their conductivity type along their growth direction from p to n; whereas those grown from the alloy with $x = 0.15$ show only n-type behavior. Some as-grown semiconducting samples have been found to be extrinsic and photoconducting. Problems associated with preparation of infrared quality HgCdTe crystal are discussed.

33196 **(CONF-861207—106) Strain and fracture in whisker reinforced ceramics.** Angelini, P.; Mader, W.; Becher, P.F. (Oak Ridge National Lab., TN (USA); Max-Planck-Institut fuer Metallforschung, Stuttgart (Germany, F.R.)). 1986. Contract AC05-84OR21400. 18p. NTIS, PC A02/MF 01; 1; GPO Dep. File Number DE87010376.

From Materials Research Society fall meeting; Boston, MA, USA (1 Dec 1986).

Whisker reinforced ceramics offer the potential for increased fracture strength and toughness. However, residual strain due to the thermal expansion mismatch between Al_2O_3 and SiC may affect mechanical properties of such composites. Crack tip interaction with the whisker/matrix may lead to changes in debonding behavior or influence other toughening mechanisms. The strain field in the Al_2O_3 matrix surrounding SiC whiskers was analyzed with a High Voltage Transmission Electron Microscope (HVEM). Strain contrast oscillations indicating the presence of residual stress in the specimen were observed in a Al_2O_3-5 vol % SiC composite having ≃ 15 μm grain size. The strain field was found to have both radial (perpendicular to whisker axis) and axial (parallel to whisker axis) components. A strain field was also present near the end faces of SiC whiskers. In situ thermal annealing to 573, 873, and 1173 K showed a decrease in the residual strain while in situ cooling to ≃ 77 K revealed little change in the strain. These results show that residual stresses in the compacts result from differences in thermal expansion and elastic constants of the matrix and whisker materials. Dynamic in situ fracture experiments performed in an HVEM on the Al_2O_3-5 vol % SiC material having ≃ 15 μm as well as on Al_2O_3-20 vol % SiC having ≃ 1 μm grain size revealed that fracture resistance is due to a number of mechanisms including debonding near the whisker matrix interface, crack deflection, pinning, and bridging by SiC whiskers. Formation of secondary fractures and microcracks near and in front of propagating crack tips was also observed in the larger grain size composite.

33197 **(DOE/ER/45114—3) Statistical mechanics of polymer systems: Progress report, September 1, 1986-August 31, 1987.** Kovac, J. (Tennessee Univ., Knoxville (USA). Dept. of Chemistry). 1 Mar 1987. Contract FG05-84ER45114. 9p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010701.

In the original proposal three areas of research were outlined: development of reasonable, but mathematically tractable models for isolated polymer chain dynamics using projection operator techniques; study of the effects of entanglements on the dynamics of polymer chains by means of computer simulation; and non-equilibrium thermodynamic and statistical mechanical theories of the glass transition. In the third year of the grant we have again focused most of our attention on the computer simulation work, but in January we began a serious study of the statistical mechanics of quenched systems. The computer simulation work continues to be fruitful. Collaborative efforts have been initiated to study various aspects of computer simulation of polymer dynamics.

33198 **(IAE—4233/11) Transmission electron-microscopic studies of structural changes in polycrystalline graphite after high temperature irradiation.** Platonov, P.A.; Gurovich, B.A.; Shtrombakh, Ya.I.; Karpukhin, V.I. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1985. 37p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702270.

Transmission electron-microscopic investigation of polycrystalline graphite before and after irradiation is carried out. The direct use of graphite samples after ion thinning, as an inquiry subject is the basic peculiarity of the work. Main structural components of MPG-6 graphite before and after irradiation are revealed, the structural mechanism of the reactor graphite destruction under irradiation is demonstrated. The mean values of L/sub αm/ and L/sub cm/ crystallite dimensions are determined. Radiation defects, occuring in some crystallites after irradiation are revealed by the dark-field electron microscopy method. 12 references, 23 figures.

33199 (INIS-mf—10889, pp 69) **Radiation-induced dilatation effects in solids from the point of view of contemporary experimental methods.** Prasil, Z.; Brozek, V. (Ustav pro Vyzkum, Vyrobu a Vyuziti Radioisotopu, Prague, Czechoslovakia; Vysoka Skola Chemicko-Technologicka, Prague, Czechoslovakia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33200 (INIS-SU—420, pp 105-106) **Specific heat of samarium, europium and gadolinium ferrite garnets in the temperature range of 298-600 K.** Varazashvili, V.S.; Tsarakhov, M.S.; Chelidze, L.I. (AN Gruzinskoj SSR, Tbilisi. Inst. Fiziologii). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33201 (INIS-SU—420, pp 103-104) **Specific heat and phase transformations in rare earth orthovanadites.** Borukhovich, A.S.; Bazuev, G.V.; Zubkov, V.G. (AN SSSR, Sverdlovsk. Inst. Khimii). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33202 (INIS-SU—420, pp 97-98) **Specific heat of calcium niobium gallium garnet.** Antyukhov, A.M.; Moiseev, N.V.; Ivanov, I.A.; Antonov, A.V. (Bryanskij Gosudarstvennyj Pedagogicheskij Inst., Byelorussian SSR). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33203 **(JINR—14-86-411) Influence of high energy ion irradiation on the luminescence of diamond.** Varichenko, V.S.; Zajtsev, A.M.; Stel'makh, V.F.; Didyk, A.Yu.; Kuznetsov, V.I.; Skuratov, V.A.; Shestakov, V.D. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions). 1986. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702328.

High energy ion irradiations influence on formation of radiation-induced defects in diamonds are investigated by luminescence method. It is shown that the distribution of defects with depth is determined by their structure and by arising of anisotropic redistribution of impurities atoms, which stimulated the radiation-induced defects. Anisotropic mechanical strains are developed in the irradiated crystal layer. 12 references, 6 figures.

33204 (JINR—D-13-85-793, pp 413-417) **Control system for silicon radiation doping.** Eponeshnikov, V.N.; Neelov, S.M.; Ostrast', M.S.; Ragulin, A.Yu.; Solodovnikov, E.S. (Tomskij Politekhnicheskij Inst., USSR. Inst. Yadernoj Fiziki, Ehlektroniki i Avtomatiki). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

A control system for silicon radiation doping is described. The system is based on mini- and microcomputers and CAMAC equipment. Silicon doping is exercised in the reactor core under the effect of thermal neutron flux from the (n,γ)-reaction bringing about formation of phosphorus doping. Software and hardware of the control system for silicon nuclear doping are discussed.

33205 **(JINR-E—14-86-448) Damage profile of high energy ion implanted GaP.** Ascheron, C.; Otto, G.; Flagmeyer, R.; Zschau, H.E.; Bugrov, V.N.; Karamyan, S.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions). 1986. 4p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702341.

Submitted to the journal Phys. Status Solidi.

Characteristics of the GaP lattice damaged by high energy ion irradiation were studied using the Rutherford backscattering of particle channeling and the Kossel effect in proton beam. Single crystals were bombarded with different ions from ^{1}H to ^{40}Ar in the energy range 0.3-1.0 MeV/nucleon. An 1 MeV proton beam was used for analysis. The dose dependences of the damage density, damage profiles and of the GaP lattice parameters were obtained. Conclusions have been drawn that, along with defect generation during bombardment, recombinations of the Frenkel pairs even at room temperature, as well as combination of high density point defects are possible. 2 figures.

33206 **(LA-UR—86-3996) Mass spectrometric studies of laser damage in calcium fluoride.** Nogar, N.S.; Apel, E.C.; Estler, R.C. (Los Alamos National Lab., NM (USA)). 1986. Contract W-7405-ENG-36. 9p. (CONF-8611154—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87002897.

From Boulder damage symposium; Boulder, CO, USA (3 Nov 1986).

Both electron impact- and laser-ionization-mass spectrometry have been used to prove the material spalled from CaF_2 surfaces by the fundamental (1.06μ) and harmonic (355 nm and 266 nm) outputs from a Q-switched Nd:YAG laser. We have identified a number of gas phase products, including Ca, CaF and tentatively, CaF_2, and have measured their translational and internal energy distributions. Results suggest that while the 1.06μ experiments can be adequately modeled in terms of a single damage mechanism (likely avalanche breakdown), the short-wavelength results suggest the onset of second mechanism, perhaps multiphoton absorption. This is consistent with both the observed bimodal velocity distribution following short-wavelength damage, and with the decrease in CaF vibrational and rotational excitation.

33207 **(LA-UR—87-214) Surface analysis of titanium coated silicone rubber biological implants.** Farr, J.D.; Hutchinson, W.B. (Los Alamos National Lab., NM (USA)). 1987. Contract W-7405-ENG-36. 18p. (CONF-870725—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87005099.

From 22. annual meeting of the Microbeam Analysis Society; Kailua-Kona, HI, USA (13 Jul 1987).

A wide variety of materials are used today in the fabrication of biomedical implants. Various plastics, ceramics, metals, and composites are found in dozens of applications as biomaterials. The biological interactions between the implant surfaces and the proteins and cells of the body sometimes cause problems such as inflammation, thrombosis, and encapsulation. Coating the implants with a biocompatible material such as titanium could alleviate these problems. In an effort to improve the biological compatibility of silicone rubber vascular grafts, thin layers of titanium were sputter deposited onto medical grade silicone rubber. The surfaces of two such samples were then characterized by Auger electron spectroscopy (AES), electron spectroscopy for chemical analysis (ESCA), elec-

tron probe microanalysis (EPM), and ion microprobe mass analysis (IMMA).

33208 **(NUREG/CR—4842) A study of natural glass analogues as applied to alteration of nuclear waste glass.** Byers, C.D.; Jercinovic, M.J.; Ewing, R.C. (Argonne National Lab., IL (USA); New Mexico Univ., Albuquerque (USA). Dept. of Geology; Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Regulatory Research). Feb 1987. Contract W-31-109-ENG-38. 163p. (ANL—86-46). NTIS, PC A08/MF A01 - GPO. File Number TI87006957.

A two-part study was undertaken on the alteration of natural basalt and nuclear waste glasses. In the first part, the University of New Mexico characterized a wide variety of natural basaltic glasses with respect to reaction products, reaction kinetics, and geologic history. The important outcome of this study was a description of the process whereby natural glass alters to palagonite and authigenic materials, including clays and zeolites. In the second part, ANL performed laboratory tests to simulate the natural alteration process with a synthetic basaltic glass. For laboratory tests in which the glass samples were exposed to water vapor at high temperature (>90°C), a close similarity was found in the alteration of natural and synthetic glasses. The same alteration process was found for a nuclear waste glass (SRL 165). It was concluded that both the natural alteration of basaltic glass and water-vapor laboratory tests can be used as an analogue to assess the performance of nuclear waste glass under potential repository conditions.

33209 **(SAND—86-2646C) Evaluation of thermal and kinetic properties suitable for high heating rate computations.** Auerbach, I.; Benson, D.A.; Wright, G.F. Jr. (Sandia National Labs., Albuquerque, NM (USA)). 1987. Contract AC04-76DP00789. 35p. (CONF-870623—4). NTIS, PC A03/MF A01; GPO Dep. File Number DE87009543.

From 22. AIAA thermophysics conference; Honolulu, HI, USA (8 Jun 1987).

Computer codes that model dimensional, weight, and energy changes in ablative or pyrolysis materials, such as ballistic missile reentry vehicle heatshields or thermal insulators, generally have to use effective rather than measured property values for some of their input. A primary reason for the discrepancy in values is that the properties are not measured under the heating rate and temperature conditions for which they will be used. In this study, heat capacity, thermal conductivity, and kinetic parameters from thermogravimetric analysis data are generated under the high heating rate conditions that simulate reentry and abrupt fire conditions. Differences in values between steady state or low heating rate data and high heating rate data are examined. The Charring Material Ablation program is used to model ablation material and insulator performance using high heating rate properties to show the improved correlation between computed and observed test results.

33210 **(SAND—87-0361C) Neutron damage equivalence in silicon, silicon dioxide, and gallium arsenide.** Luera, T.F.; Kelly, J.G.; Lazo, M.; Lee, C.E. (Sandia National Labs., Albuquerque, NM (USA); New Mexico Univ., Albuquerque (USA); Tills (Jack) and Associates, Inc., Albuquerque, NM (USA)). Feb 1987. Contract AC04-76DP00789. 5p. (CONF-870724—5). NTIS, PC A02. File Number DE87005856.

From 24. annual conference on nuclear and space radiation in electronics; Snowmass, CO, USA (28 Jul 1987).

Displacement damage and ionization in Si, SiO_2, and GaAs are evaluated with representative neutron spectra using kerma factors generated with the NJOY code. Calculated damage ratios are compared with experiment. Impact on simulation fidelity is addressed.

33211 **(UCID—21081) Bonding of silica aerogel with silicone resin GR650.** Burnham, A. (Lawrence Livermore National Lab., CA (USA)). 8 May 1987. Contract W-7405-ENG-48. 14p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010619.

A method has been developed to bond smooth faces of silica aerogel together with Owens-Illinois silicone resin GR650. The resin is ground into a fine powder and deposited onto the aerogel surfaces. The pieces are then placed together, a pressure of 4 psi applied, and heated to 120°C overnight. Continuous bonds with a thickness of less than 1 μm have been obtained. Tensile failure of the bond is usually cohesive, and strengths of about 10 psi have been obtained, which is approximately the tensile strength of the aerogel. Structural information on GR650 from GPC and ^{29}Si, ^{13}C and proton NMR is also presented.

33212 **(UCRL—52000-87-3) Energy and Technology Review: Engineering technology.** (Lawrence Livermore National Lab., CA (USA)). Mar 1987. Contract W-7405-ENG-48. 58p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87009225.

This issue highlights research being conducted in six emerging engineering technologies: materials engineering, modal analysis, nondestructive evaluation, microwaves and pulsed power, remote sensing and signal engineering, and diagnostics and microelectronics. Interdisciplinary research in materials engineering ranges from studies of state-or-the-art materials, such as composite laminates and Hadfeld steels with ultrafine grains, to investigations of the aging characteristics of commonly used elastomers. The goal is to understand quantitatively the physical and mechanical properties of materials that have important engineering applications. By combining new developments in high-resolution inspection systems, data analysis, and acoustics models, an improved ability to quantify both the ultrasonic and radiographic inspection processes has been obtained. Investigations of the resonant frequencies and other modal parameters of structures used at the Laboratory to house experimental equipment ensure the stability and integrity of structures during physics experiments. A broad-based program of research is being conducted for improving the ability to generate high-power microwaves and high-power electron beams, extending electrical switching into new high-power domains, improving the electrical performance of dielectric materials, and studying electromagnetic coupling phenomena as they relate to weapon vulnerability. Finally, methods for extracting useful information from noisy or distorted signals have a wide variety of energy and defense applications. 35 refs., 37 figs., 3 tabs.

33213 **(UCRL—95215) Confined compressive strength of saline ice at intermediate strain rates.** Blair, S.C. (Lawrence Livermore National Lab., CA (USA)). Jun 1986. Contract W-7405-ENG-48. 19p. (CONF-8606114—4). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009736.

From Ice penetration technology workshop; Monterey, CA, USA (16 Jun 1986).

Detailed knowledge of the mechanical behavior of saline ice at elevated confining pressure and at intermediate strain rates is essential input to predictive models used to advance technology for projectile penetration of ice. We present here our results on ice behavior at confining pressures of 0.1 to 50 MPa, temperatures of -10 to -20°C, strain rates of 10^{-2} and 0.5/s. These results indicate stress-strain behavior in directions perpendicular and parallel to a sheet of first-year sea ice. Results show that at a strain rate of 1.0×10^{-3}/s and -10°C, values of ultimate stress for unconfined vertical and horizontal orientations are in the range of 4 to 5 MPa. When the strain rate is raised to 0.5/s, at the same temperature, ultimate stress for unconfined vertical and horizontal samples increases from 5 to 8 MPa and 4.5 to 5.5 MPa, respectively. The ultimate stress for confined vertical samples at 10^{-3}/s is much higher than that of confined horizontal samples, and although the horizontal samples become ductile at a mean stress of about 7.5 MPa and have a corresponding ultimate stress of 12 MPa, vertical samples remain brittle at mean stresses as high as 26 MPa with a corresponding ultimate stress of 24 MPa. Horizontal samples tested at 0.5/s have much higher confined compressive strength, and the mean stress associated with the brittle-to-ductile transition increases to more than 30 MPa.

33214 **(UCRL—95502) Use of the WYKO and Sommargren profilers in polishing research.** Brown, N.J. (Lawrence Livermore National Lab., CA (USA)). 1986. Contract W-7405-ENG-48. 11p. (CONF-860880—51). NTIS, PC A02. File Number DE87007336.

From 30. SPIE technical symposium on optics and optoelectronic engineering; San Diego, CA, USA (17 Aug 1986).

This paper compares the WYKO and Sommargren noncontact surface profilers, describes their utility and limitations, their accuracy and their use in polishing research. Surface readings below 1A rms by these instruments are reported.

33215 **(UCRL—96621) Computer simulations for research in dynamic compaction.** Wilkins, M.L. (Lawrence Livermore National Lab., CA (USA)). May 1987. Contract W-7405-ENG-48. 26p. (CONF-8705109—4). NTIS, PC A03/MF A01; GPO Dep. File Number DE87009848.

From IMPACT '87; Bremen, F.R. Germany (18 May 1987).

The consolidation of powders using high explosives as a source of pressure is a research area of current interest in many laboratories. The technology has experienced difficulty in reaching industrial applications due to the many poorly understood phenomena involved. The conditions for successful consolidation of powders by explosive compaction are located by extensive experimentation. Computer simulations of experiments are very useful in identifying the pressure-density-time histories of the materials. This information can be used to guide the experimentalist in the design of new experimental arrangements, reducing the number of experiments required.

33216 **Magnetic susceptibility of CfCl/sub 3/ and its dependence on crystal structure.** Nave, S.E.; Moore, J.R.; Peterson, J.R.; Haire, R.G. (Tennessee Univ., Knoxville, USA. Dept. of Physics; Tennessee Univ., Knoxville, USA. Dept. of Chemistry; Oak Ridge National Lab., TN, USA. Transuranium Research Lab.). *Journal of the Less-Common Metals;* 127: 79-85(Jan 1987). (CONF-860602—).

From 17. rare earth research conference; Hamilton, Ontario, Canada (8 Jun 1986).

Magnetic measurements are presented for polycrystalline samples of californium trichloride in both a hexagonal (UCl/sub 3/ type; californium(III) CN=9) and an orthorhombic (PuBr/sub 3/ type; californium(III) CN=8) crystal form. In the Curie-Weiss temperature regions (orthorhombic, 100-340 K, hexagonal, 60-340 K) the Weiss constant θ/sub p/ is significantly larger for the orthorhombic form. As the temperature decreases, the susceptibility of the orthorhombic form begins to deviate from Curie-Weiss behavior at a higher temperature than the hexagonal form indicating a larger crystal-field splitting in the orthorhombic form. At temperatures below 15 K a field-dependent transition is observed. In a field of 5 kG an antiferomagneetic maximum in the susceptibility is observed at 7 K and 13 K for the hexagonal and orthorhombic forms respectively. For 30 kG both types exhibit monotonically increasing susceptibilities with decreasing temperature and the hexagonal form shows saturation behavior in the susceptibility vs. temperature plots with a saturation moment of about 6 μ/sub B/ atom/sup -1/.

33217 **The effect of the size of structural bulk inhomogeneities on the specular transmittance of polymer films.** Neidlinger, H.H. (Materials Research Branch, Solar Energy Research Institute, Golden, CO 80401). pp 112-117 of Materials and optics for solar energy conversion and advanced lighting technology. Lampert, C.M.; Holly, S. Bellingham, WA; SPIE Society of Photo-Optical Instrumentation Engineers (1986). (CONF-860880—). Contract AC02-83CH10093.

From 30. SPIE technical symposium on optics and optoelectronic engineering; San Diego, CA, USA (17 Aug 1986).

This paper is confined to the effect of optical inhomogeneities in polymer films on the scattering or specular transmittance of light. Potential causes for the presence of scattering entities in the bulk phase of polymers are discussed. It is shown that practical transmittance measurements are greatly influenced by the angular width of the instrument receptor aperture. The choice of larger receptor apertures will tend to include some of the scattering at small angles due to large inhomogeneities in the measurement of specular transmittance. As a consequence, the transmittance measured is not necessarily increased by reducing the size of the inhomogeneities in the polymer films, but there is a critical size when the specular transmittance is a minimum.

33218 **Calibrated Faraday current and magnetic field sensor.** Neyer, B.T.; Chang, J.; Lockwood, G.J.; Ruggles, L.E. (Diagnostics Div., 1234, Sandia National Labs., P.O. Box 5800, Albuquerque, NM 87185). pp 389-392 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—).

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

The authors have developed a calibrated optical fiber Faraday rotation current sensor. This sensor has a Gigahertz response, is immune to electromagnetic interference, and is constructed entirely of dielectric material. All off these advantages make the sensor ideal for pulsed power measurements.

33219 **Improvements in glazings - SERI materials research in progress.** Potter, T.F. (Solar Energy Research Institute). pp B247-B258 of Proceedings of the ACEEE 1984 summer study on energy efficiency in buildings. Washington, DC; American Council for an Energy Efficient Economy (1984). (CONF-840819—). Contract AC02-83CH10093.

From ACEEE meeting on energy efficiency in buildings - doing better: setting an agenda for the second decade; Santa Cruz, CA, USA (14 Aug 1984).

Progress in two areas with significant long-term potential for improving the thermal performance of apertures is summarized and evaluated. Removing interglazing gasses may greatly reduce the conductive/convective thermal transfer through multiple pane glazings. Evacuated glazings now under investigation show the expected high resistance to thermal conductance and convection; laboratory-scale demonstration units have been produced with laser sealed edges. Another approach, more applicable for cooling load offset, addresses the possibility of electrically controlling the transmission of solar radiation through windows. Electrochromic glazings can be operated by means of low-voltage switching to adjust the visual and infrared transmittance of the aperture. Both concepts are discussed in relation to the overall goal of greatly reducing unwanted gains and losses through windows and the commercially available alternatives to these concepts. Analyses of optimal characteristics and recent technical advances at SERI are described, and future research requirements are sketched.

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33220 **(MLM—3424) Mound activities in chemical and physical research: July-December 1986.** (Monsanto Research Corp., Miamisburg, OH (USA). Mound). 22 Apr 1987. Contract AC04-76DP00053. 33p. NTIS, PC A03/MF A01; GPO Dep. File Number DE87010638.

The following were studied: helium-3 virial coefficients for low-temperature thermometry, thermal diffusion of deuterated benzene, separation of silicon isotopes by thermal diffusion using tetramethylsilane, separation of Ca isotopes by chromatography of cryptand ligands, and speciation of plutonium in environmental waters. (DLC)

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REFER ALSO TO CITATION(S) 32450, 32450, 32516, 32535, 32590, 33019, 33269, 33269, 33647

33221 **(DOE/CE/40544—1) Pilot plant development of chemical air separation process: Report of period 1 October 1984-30 September 1986.** Dunbobbin, B.R.; Brown, W.R. (Air Products and Chemicals, Inc., Allentown, PA (USA)). Feb 1987. Contract AC07-82CE40544. 93p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE87010080.

The overall objective of this program was to develop the economic viability of a new air separation process for oxygen production, termed the MOLTOX system. This report presents the results of the completion of Task 1, which confirmed market predictions for the MOLTOX system and showed a significant need for new oxygen plants. The MOLTOX system can compete for 80% to 90% of the total projected markets. The report also includes the

results from Task 2, Pilot Plant Construction and Operation. Pilot plant operation began in December 1985, and several experimental runs have been completed. Run I was instrumentation and control and hydraulic testing of the plant before oxygen production, and Run II was a low-temperature oxygen generation trial. Runs III and IV were "proof of concept" runs, which were intended to demonstrate operation of the plant at base-case absorber column and desorber design conditions. Results indicate that the process chemical performance essentially meets all expectations and confirms predictions. The corrosion results show that the materials of construction are generally adequate, except at high-temperature, two-phase flow locations, namely the oxygen desorption heat exchanger, and in regions of high fluid velocity.

33222 **(DOE/ER/10946—T1) Mechanisms of cake filtration: Progress report, April 1986-February 1987.** (Houston Univ., TX (USA). Dept. of Chemical Engineering). 16 Feb 1987. Contract AS05-81ER10946. 17p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010515.

We have studied the variations of porosity and specific resistance with applied pressure (i.e., the filtration characteristics) of 0.1 to 2.0 μm diameter uniform spherical particles, and have drawn up "compressibility map" to summarize these data. These data potentially offer a standard for the filtration industry. We have developed a novel easy-to-use, easy-to-clean apparatus for rapidly measuring the filtration behavior of a material. We prepared two publications, one describing the properties of the slurries studied, and the other providing a detailed description of the apparatus.

33223 **(DOE/ER/13613—7) Capillary liquid chromatography using laser-based and mass spectrometric detection: Technical progress report for the period September 1, 1986-August 31, 1987.** Sepaniak, M.J.; Cook, K.D. (Tennessee Univ., Knoxville (USA). Dept. of Chemistry). 22 May 1987. Contract FG05-86ER13613. 13p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010303.

CLG was studied for the analysis of small, complex samples and of difficult-to-resolve compounds. Optical and mass spectrometric detection for CLG was also studied. Emphasis was on micellar electrokinetic capillary chromatography. Biological materials have been successfully separated. (DLC)

33224 **(IAEA-RL—137(Monaco/31)) Intercalibration of analytical methods on marine environmental samples. Results of MEDPOL II exercise for the intercomparison of trace element measurements on mussel tissue homogenate and marine sediment (MA-M-2/TM and SD-N-1/2/TM).** (International Atomic Energy Agency, Monaco-Ville (Monaco). Lab. of Marine Radioactivity). Dec 1986. 42p. NTIS (US Sales Only), PC A03/MF A01. File Number DE87702279.

Mussels and coastal sediments are often considered as pollution indicators of the marine environment. These intercalibration exercises were organised in order to check the analytical performances of environmental laboratories. The samples MA-M-2/TM of Mediterranean mussels and SD-N-1/2/TM of surface sediment from the Scheldt Estuary (North Sea) were analysed by 19 laboratories for determination of 15 elements: Ag, As, Cd, Co, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Sb, Se, V and Zn. The analytical methods of atomic absorption spectroscopy, neutron activation analysis and voltametry were used in this intercomparison. For the mussel MA-M-2/TM, 65% of the reported coefficients of variation lie between 0 and 10%, 25% are between 10 and 20%, 9% between 20 and 30% and only 1% higher than 30%. In the case of the sediment SD-N-1/2/TM, 90% of the reported coefficients of variation lie between 0 and 10% and the remaining 10% are between 10 and 20%. The total number of outliers is moderate (9.2% of all results in the case of MA-M-2/TM and 3.0% in the case of SD-N-1/2/TM). 4 references, 32 tables.

33225 **(LA—10944) Rapid determination of uranium by x-ray fluorescence.** Martell, C.J.; Hansel, J.M. (Los Alamos National Lab., NM (USA)). May 1987. Contract W-7405-ENG-36. 4p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009480.

This report describes a method for rapidly determining the amount of uranium using x-ray fluorescence. We add an aliquot of sample solution plus the internal standard element, yttrium, to a 10-ml volumetric flask. We transfer this solution to an x-ray cell and read the Lα1 line of uranium and the Kα1 line of yttrium. We then compare the ratio of uranium to yttrium for the sample with the ratios obtained from standards. This rapid, highly accurate procedure has a relative standard deviation of 0.69% for samples containing 1 to 5 mg U/ml. 2 refs., 2 figs., 2 tabs.

33226 **(LA-UR—87-1781) Removal of isobaric interferences via pulsed laser resonance ionization mass spectrometry (RIMS) for lead and bismuth mixtures.** Fearey, B.L.; Anderson, J.E.; Miller, C.M.; Nogar, N.S.; Rowe, M.W. (Los Alamos National Lab., NM (USA); Texas A and M Univ., College Station (USA)). 1987. Contract W-7405-ENG-36. 3p. (CONF-8705114—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010135.

From 35. conference on mass spectrometry and applied topics; Denver, CO, USA (24 May 1987).

Pulsed laser single color 2 + 1 multiphoton ionization is used to eliminate isobaric interferences for lead and bismuth mixtures detected via resonance ionization mass spectrometry.

33227 **(SAND—87-0049) Enhancement of mass spectral data handling using an IBM personal computer.** Trudell, D.E. (Sandia National Labs., Albuquerque, NM (USA)). Mar 1987. Contract AC04-76DP00789. 26p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87010530.

A method for interfacing an IBM Personal Computer (PC) to a Hewlett-Packard (HP) 9825 desktop computer system is described. The HP 9825 computer provides control and data acquisition for an HP 5970A Mass Selective Detector (MSD) coupled to an HP 5880A gas chromatograph (GC). The GC/MSD is used in catalyst deactivation studies for identification and characterization of organic compounds in complex mixtures. The complexity of the samples has prompted the need to access commercially available mass spectral search systems to take advantage of large mass spectral data bases and various search algorithms. The interface permits mass spectral data to be transferred from the HP 9825 computer to the IBM PC and stored on diskette. The stored spectral data can then be transferred from the IBM PC to a commercial mass spectral search system. The interface provides several advantages, including efficient and economical transfer of mass spectral files to a commercial search system, permanent storage of spectral data on diskette, and off-line data analysis while analyzing samples with the GC/MSD.

33228 **(SAND—87-0064) Examination of FeS_2 and related compounds by x-ray photoelectron spectroscopy and auger electron spectroscopy.** Madden, H.H.; Guidotti, R.A.; Nebesny, K.W. (Sandia National Labs., Albuquerque, NM (USA); Arizona Univ., Tucson (USA). Dept. of Chemistry). Apr 1987. Contract AC04-76DP00789. 19p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009355.

An x-ray photoelectron spectroscopy (XPS) investigation of iron compounds containing sulfur and/or oxygen has been made in an attempt to assemble a catalog of spectra that could be used to identify oxidized-iron compounds present as contaminants on the surfaces of iron pyrite samples. Pyrite is used as the active cathode material in Li(Si)/FeS_2 thermal batteries; the oxidized-Fe surfaces compounds are thought to be deleterious to proper operation of the batteries. The catalog of spectra finally assembled was found to be subject to questions related to the importance of carbon and oxygen contaminants on the surface of the reference samples, and to XPS lineshape changes that accompanied ion-bombardment cleaning of pyrite surfaces. These questions are discussed. Despite these questions, two clear-cut "signatures" of an iron sulfate contaminant on pyrite surfaces were determined. Results of a high-spatial-resolution Auger electron spectroscopy study of pyrite fracture surfaces, produced in situ, are discussed in an interpretation of the sources and forms of the carbon and oxygen surface contaminants encountered in the XPS measurements.

33229 (SAND—87-0554) A Curie point pyrolysis - dual FSOT capillary column gas chromatographic system: I. Conception and design. Burns, F.B.; Rodacy, P.J. (Sandia National Labs., Albuquerque, NM (USA)). May 1987. Contract AC04-76DP00789. 30p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87010533.

A Curie point pyrolysis dual fused silica open tubular (FSOT) gas chromatographic system has been designed and fabricated for the detection and identification of trace levels of polymeric-like contaminants. A Curie point pyrolyzer, utilizing ferromagnetic foils as sample holders, was chosen because its use results in greater sample temperatures reproducibility, minimizes sample handling, and eliminates the need to solubilize solid samples. Reproducibility is optimized by using a small hand press for folding the foil around the sample and applying uniform, reproducible pressure to the sample. Detection levels are improved through chemical and plasma cleaning of the foils prior to pyrolysis. The gas chromatographic instrumentation incorporates two parallel FSOT capillary columns of differing polarity, each with its own flame ionization detector and electrometer, to simultaneously generate two unique "fingerprint" pyrolysis chromatograms (pyrograms). The system has demonstrated its usefulness by identifying microscopic-sized particles found in Rolamite assemblies.

33230 (UCRL—92410) High resolution tomography with chemical specificity. Bonse, U.; Johnson, Q.; Nichols, M.; Nusshardt, R.; Krasnicki, S.; Kinney, J. (Lawrence Livermore National Lab., CA (USA); Dortmund Univ. (Germany, F.R.). Inst. fuer Physik; Sandia National Labs., Livermore, CA (USA)). Aug 1985. Contract W-7405-ENG-48. 19p. (CONF-850734—26). NTIS, PC A02. File Number DE87008752.

From 2. international synchrotron radiation instrumentation conference; Stanford, CA, USA (29 Jul 1985).

A very fast method of computerized critical absorption tomography featuring ~10 μm spatial resolution and high chemical sensitivity is described. Synchrotron radiation is used and the method is especially suited to investigating small samples. From a preliminary experiment it is found that layers of neighboring elements only 0.2 μm thick can be distinguished at medium atomic numbers.

33231 New approach to the study of nuclear Bragg scattering of synchrotron radiation. Faigel, G.; Siddons, D.P.; Hastings, J.B.; Haustein, P.E.; Grover, J.R.; Remeika, J.P.; Cooper, A.S. (Brookhaven National Laboratory, Upton, New York 11973). *Physical Review Letters;* **58**: No. 25, 2699-2701(22 Jun 1987). Contract AC02-76CH00016.

Nuclear Bragg scattering of synchrotron radiation from isotopically enriched /sup 57/Fe_2O_3 has been observed at a signal-to-noise ratio of 100:1 without delayed-coincidence techniques. The use of a high-resolution premonochromator providing a 5-meV energy spread and 0.4" collimation allows for high-resolution studies of dynamical diffraction effects. In particular, the observed intensity of the pure nuclear (7,7,7) reflection implies a dramatic decrease of the effective lifetime due to coherent scattering.

33232 Positive-signal indirect fluorometric detection in ion chromatography. *Analytical Chemistry;* **59**: No. 9, 1362-1364(1 May 1987). Contract FG05-84ER13281.

Of all common properties monitored in chromatographic detection, fluorescence is perhaps the only one that is not a monotonic function of concentration. If indirect detection is defined as a technique which monitors deficiencies in eluent constituents rather than the emergence of sample components per se, a unique potential exists for indirect fluorimetric detection. Thus, the purpose of this paper is to report that with the eluent ion concentration in the strongly self-quenched region, indirect but positive signal fluorometric detection is a possibility worthy of consideration.

33233 Polyphosphazene semipermeable membranes. Allen, C.A.; McCaffrey, R.R.; Cummings, D.G.; Grey, A.E.; Jessup, J.S.; McAtee, R.E. (to Dept. of Energy). US Patent Application 6-868,478. 30 May 1986. 25p. Contract AC07-76ID01570. DE87007184 NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87007184.

A semipermeable, inorganic membrane is disclosed; the membrane is prepared from a phosphazene polymer and, by the selective substitution of the constituent groups bound to the phosphorous in the polymer structure, the selective passage of fluid from a feedstream can be controlled. Resistance to high temperatures and harsh chemical environments is observed in the use of the phosphazene polymers as semipermeable membranes.

33234 Tuning the effective autoneutralization lifetime of SF/sub 6//sup -/. Delmore, J.E.; Appelhans, A.D. (Idaho National Engineering Lab., EG and G Idaho, P.O. Box 1625, Idaho Falls, ID 83415). pp 562-563 of Proceedings of the 34th annual conference on mass spectrometry and applied topics. Lansing, MI; American Society for Mass Spectrometry (1986). (CONF-8606236—).

From 34. annual conference on mass spectrometry and allied topics; Cincinnati, OH, USA (8 Jun 1986).

This paper describes a process termed "autoneutralization", analogous to the term autoionization, whereby an excited molecule autodetaches an electron to give a positive ion. SF/sub 6//sup -/ autoneutralization mean lifetimes (l/k) ranging from 10 μS up to milliseconds with many intermediate values have been reported. These studies have employed time-of-flight mass spectrometry, ion cyclotron resonance, and pulsed-source magnetic-sector mass spectrometry to measure ion-to-neutral ratios, free electron production, and the change in ion intensity with time. It has been proposed that the wide range of reported lifetimes is a result of multiple states of SF/sub 6//sup -/ autoneutralizing at different rates (lifetimes), and that the observed mean lifetime is a function of the time frame (from the point of ion formation) in which the observation was made. If this is the case the various techniques previously applied would be expected to produce differing results. Although the multiple-state hypothesis appears reasonable, the mechanism(s) controlling the hypothesized distribution of states (and thus mean lifetime) has not previously been clearly demonstrated. The present study was undertaken to clarify some of these issues by applying an alternate experimental approach: the direct measurement of the SF6 neutrals produced in a beam of SF6/sup -/ ions under a variety of source temperatures, pressures, and accelerations voltages.

33235 Practical uses of neutron capture gamma-ray spectroscopy. Chrien, R.E. (Brookhaven National Lab., Upton, NY). pp 187-212 of Neutron radiative capture. Allen, B.J.; Bergovist, I.; Chrien, R.E.; Gardner, D.; Poenitz, W.P. Elmsford, NY; Pergamon Books Inc. (1984).

There is available a wide variety of commercial and research applications of neutron-induced prompt gamma-ray analysis (PGA) and other applications of neutron capture in isotope production, transmutation and therapy. Most of these applications are important in areas other than those associated with nuclear energy production and therefore demonstrates the usefulness of nuclear techniques for alternative energy sources such as fossil fuels. The non-destructive, rapid, and accurate analyses produced by the PGA technique suggests that it will continue to enjoy a rapidly growing popularity in the future.

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REFER ALSO TO CITATION(S) 32477, 32478, 32479, 32590, 33055, 33233, 33319, 33321, 33326, 33748

33236 (INIS-SU—420, pp 167-168) Calorimetric study of indium triiodite. Chusova, T.P.; Sukhovej, K.S.; Stenin, Yu.G.; Titov, V.A. 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33237 (INIS-SU—420, pp 159-160) **Low-temperature specific heat and phase transformations of organic compounds of selenium and tellurium.** Shejman, M.S.; Nistratov, V.P.; Kamelova, G.P.; Karataev, E.N.; Feshchenko, I.A.; Fedoseev, V.B. (Gor'kovskij Gosudarstvennyj Univ., USSR. Nauchno-Issledovatel'skij Inst. Khimii). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33238 (INIS-SU—420, pp 153-154) **Low-temperature specific heat and thermodynamic functions of a number of rare earth chlorides.** Tolmach, P.I.; Gorbunov, V.E.; Goryushkin, V.F. (AN SSSR, Moscow. Inst. Vysokikh Temperatur; AN SSSR, Moscow. Inst. Obshchej i Neorganicheskoj Khimii; Sibirskij Metallurgicheskij Inst., Novokuznetsk, USSR). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33239 (INIS-SU—420, pp 141-142) **Thermodynamics of alkyl compounds of nontransition elements.** Rabinovich, I.B.; Nistratov, V.P.; Shejman, M.S. (Gor'kovskij Gosudarstvennyj Univ., USSR. Nauchno-Issledovatel'skij Inst. Khimii). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33240 (INIS-SU—420, pp 137-138) **Low-temperature specific heat and thermodynamic functions of double molybdates of potassium and the yttrium subgroup rare earths.** Paukov, I.E.; Reznik, L.E.; Frolova, G.I. 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33241 (INIS-SU—420, pp 135-136) **High-temperature enthalpy and specific heat of neodymium, europium and erbium metatungstates.** Nadiradze, A.A.; Gvelesiani, G.G.; Tsagarejshvili, D.Sh.; Omiadze, I.S. (AN Gruzinskoj SSR, Tbilisi. Inst. Metallurgii). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33242 (INIS-SU—420, pp 121-122) **High-temperature heat capacities of Li-containing ternary semiconductors.** Pirl, E.; Nowak, G.; Kuehn, U.; Boehnke, U.; Neumann, H. (Karl-Marx-Universitaet, Leipzig, German Democratic Republic. Sektion Chemie; Karl-Marx-Universitaet, Leipzig, German Democratic Republic. Sektion Physik). 1986. NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33243 (INIS-SU—420, pp 117-118) **Specific heat and phase transformations of rare earth chromites at low temperatures.** Kogan, B.S.; Dolinina, I.V.; Zakharova, N.D.; Seliverstov, N.F.; Ryabin, V.A. (Ural'skij Nauchno-Issledovatel'skij Khimicheskij Inst., Sverdlovsk, USSR). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33244 (INIS-SU—420, pp 113-114) **Determination of melting enthalpies of lanthanide trichlorides by the DTA method.** Goryushkin, V.F.; Kiseleva, T.V.; Laptev, D.M. (Sibirskij Metallurgicheskij Inst., Novokuznetsk, USSR). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33245 (INIS-SU—420, pp 109-110) **Thermodynamic properties and phase transformations of alkali metal borohydrides.** Gorbunov, V.E.; Gavrichev, K.S.; Totrova, G.A.; Lazarev, V.B. (AN SSSR, Moscow. Inst. Obshchej i Neorganicheskoj Khimii). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33246 (INIS-SU—420, pp 107-108) **High-temperature enthalpy of some lanthanide oxyfluorides.** Vorob'ev, A.F.; Lazarev, V.M.; Yakunina, G.M.; Zvezdina, I.M.; Gorbunov, D.K. (Moskovskij Khimiko-Tekhnologicheskij Inst., USSR; Moskovskij Gosudarstvennyj Pedagogicheskij Inst., USSR; Moskovskij Gosudarstvennyj Univ., USSR). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33247 (INIS-SU—420, pp 101-102) **Thermodynamic properties of rare earth sulfides of the Ln/sub 3/S/sub 4/ composition.** Bolgar, A.S.; Kriklya, A.I.; Drozdova, S.V.; Klochkov, L.A. (AN Ukrainskoj SSR, Kiev. Inst. Problem Materialovedeniya). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33248 (INIS-SU—420, pp 99-100) **Thermodynamic study of zirconium chlorides.** Berezovskij, G.A.; Prokopenko, I.V.; Tagaev, A.B.; Izmajlovich, A.S. (Moskovskij Gosudarstvennyj Pedagogicheskij Inst., USSR). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33249 (INIS-SU—420, pp 91-92) **Specific heat and phase transformations of cesium rare earth double molybdates.** Anders, Eh.E.; Volchok, I.V.; Zvyagin, A.I.; Startsev, S.V. (AN Ukrainskoj SSR, Kharkov. Fiziko-Tekhnicheskij Inst. Nizkikh Temperatur). 1986. (In Russian). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144. (CONF-8606301—Pt.2-Summs.).

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

33250 **(INIS-SU—420) 11. All-Union conference on calorimetry and chemical thermodynamics. Pt. 2. Summaries of reports.** (AN SSSR, Moscow; AN SSSR, Novosibirsk. Inst. Neorganicheskoj Khimii). 1986. 221p. (In Russian). (CONF-8606301—Pt.2-Summs.). NTIS (US Sales Only), PC A10/MF A01. File Number DE87780144.

From 11. All-Union conference on calorimetry and chemical thermodynamics; Novosibirsk, USSR (17 Jun 1986).

Individual items in scope for the data base are processed separately. (DLC)

33251 (IS-T—1301) Improvements in the reaction system for decomposing calcium sulfate. Floy, K.R. (Ames Lab., IA (USA)). Jun 1987. Contract W-7405-ENG-82. 154p. NTIS, PC A08/MF A01; 1; GPO Dep. File Number DE87010917.

Much research has been directed to the development of a process for decomposing calcium sulfate into calcium oxide and sulfur dioxide in a two-zone fluidized bed reactor. During the present investigation, the process was improved by devising methods to prevent scale accumulation in the off-gas system of the reactor and by implementing a method of preheating the solid feed material before it was fed to the reactor with waste heat contained in the off-gas from the reactor. These two improvements allow for operation of the reactor system over an extended period of time and for a significant reduction in the fuel requirements. Two types of scales were found to accumulate in the off-gas system. A hard scale composed of sintered calcium sulfate was found at the outlet of the fluidized bed reactor, while a soft scale was found deposited throughout the off-gas system. The hard scale formation was prevented by not allowing entrained particles to settle at the outlet of the reactor and by maintaining the temperature at a level low enough that sintering could not occur. Soft scale accumulation was prevented by the introduction of either unreacted feed material or reacted overflow product into the off-gas piping and its subsequent removal downstream by means of a cyclone separator. The abrasive action of the solid particles served to scour the pipe walls and prevent scale accumulation. With the elimination of these two types of scales in the off-gas system, it was demonstrated that the reactor system could be operated in a trouble-free manner over extended periods. Feed preheating was accomplished through the implementation of a second fluidized bed above the main fluidized bed. 44 refs., 27 figs., 20 tabs.

33252 (ITEF—52(1985)) Behaviour of molecules of ion solvate shell in alternating electric field. Byakov, V.M.; Petukhov, V.R.; Firsov, V.G.; Sukhanovskaya, A.I. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). 1985. 23p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702311.

Behaviour of nearest to ion solvent molecules in the absence and at asymmetric atternating electric field superposition is illustrated by an example of alkali metal ions. The ion diffusion rate in the solvent is shown to correlate with mobility of the nearest molecules of the solvent. This effect is interpreted as a consequence of a double character of ion migration in the solvent - displacements together with solvating ion molecules and displacements without a solvant shell. The last should lead to difference in diffusion coefficients of isotopic ions. The isotopic effect in ion diffusion in the electrolyte solvent can be potentiated by alternating electric field superposition. 14 references, 5 figures.

33253 (JINR-R—14-86-429) Low temperature structure and lattice dynamics of 4,4'-difluorobiphenyl. Belushkin, A.V.; Wasicki, J.; Natkaniec, I.; Wasiutynski, T.; Telezhenko, Yu.V.; Khomenko, V.G. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics). 1986. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702381.

Submitted to the journal Acta Phys. Pol.

Phonon frequencies in the center of the Brillouin zone, dispersion relations, and density of phonon states were calculated for 4,4'-difluorobiphenyl, following structure investigation by means of X-ray diffraction on a monocrystalline sample at 120 K (monoclinic unit cell containing two planar molecules, space group $P2_1/a$). Interphenyl modes were taken into account in the model being used, and the intermolecular potential of 6-exp was chosen. The resulting phonon density of states, weighted by the squares of hydrogen amplitudes were then compared with the one deduced from the inelastic incoherent neutron scattering (IINS)) data. From the calculated dispersion relations it can be inferred, that the incommensurate phase transition (well established in isostructural biphenyl) does not occur in 4,4'-difluorobiphenyl. 21 references, 5 figures, 5 tables.

33254 (MLM—3435) The separation and characterization of a hydrogen getter product mixture: Part 2, measurement of product vapor pressures. Fircish, D.W.; Shell, T.R. (Monsanto Research Corp., Miamisburg, OH (USA). Mound). 4 Jun 1987. Contract AC04-76DP00053. 8p. NTIS, PC A02/MF A01; GPO Dep. File Number DE87010640.

HCPB is the acronym of an organic hydrogen getter compound used in weapon systems. When this material scavenges hydrogen by reacting with it, a number of compounds are formed, each of which is more volatile than HCPB. It is desirable to know the vapor pressure of these products in order to assess their migration potential within the weapon. In this study, individual compounds from a reacted HCPB mixture were isolated and their vapor pressures were measured. Three of the four fractions examined with a modified capacitance manometer were found to have vapor pressures under 1 mtorr; the fourth was measured at 92 +- 15 mtorr. An attempt was made to obtain boiling point data on the two liquid components of the getter mixture, but they decomposed before reaching their boiling points.

33255 ^{19}F shielding anisotropy in $RbCaF_3$. Kaliaperumal, R.; Sears, R.E.J.; Finch, C.B. (Department of Physics, North Texas State University, Denton, Texas 76203). *Journal of Chemical Physics;* **87**: No. 1, 68-72(1 Jul 1987).

A ^{19}F NMR multipulse measurement of the chemical shift in a single crystal of cubic $RbCaF_3$ gave -47.0 +- 3 ppm as the isotropic value with respect to C_6F_6, and 128.7 +- 6 ppm as the anisotropy. The shielding is accounted for by the usual diamagnetic and paramagnetic ionic overlap and covalent terms. As a result, the Ca^{++} -F^- bond is estimated to be 98% ionic. No significant spectral changes were found when the crystal was cooled below the cubic to tetragonal phase transition temperature. Reasons for this are given.

33256 Dynamical temporal evolution of molecular IR absorption spectra observed with picosecond CO_2 laser pulses. Mukherjee, P.; Kwok, H.S. (Department of Electrical and Computer Engineering, State University of New York at Buffalo, Amherst, New York 14260). *Journal of Chemical Physics;* **87**: No. 1, 128-138(1 Jul 1987).

The variation of the collisionless absorption spectral shapes for vibrationally excited SF_6 and C_2F_5Cl molecules as a function of the picosecond probe pulse duration was determined using a two-IR frequency pump—probe scheme. The experiments revealed a spectral narrowing with decreasing pulse duration, similar to a recent observation in C_6F_7I with a single laser pulse. For C_2F_5Cl, the vibrational temperature dependence of the spectral narrowing was also studied. The observed experimental results are shown to be consistent with a dynamic multitier classification of energy levels in the QC of polyatomic molecules. An empirical calculation was used to evaluate the relevant parameters associated with the intramolecular coupling. Specifically, the time constants for such a coupling are evaluated to be >20 ps for all the molecules studied. The effect of variable density of states on the time constant and spectral width is also discussed on the basis of the C_2F_5Cl data. It was found that both the redshift and the degree of spectral broadening increased with the internal energy of the molecule. The redshift was also observed to saturate at $\langle n \rangle$—13. This dynamical spectral measurement is distinguished from the usual static spectral measurements in that the laser—molecule interaction time is used as a parameter, thus circumventing the usual pitfalls of inferring dynamical information from spectral measurements.

33257 Theory of H bonding and vibration on close-packed metal surfaces. Feibelman, P.J.; Hamann, D.R. (Sandia National Laboratories, Albuquerque, New Mexico 87185). *Journal of Vacuum Science and Technology, A: Vacuum, Surfaces, and Films;* **5**: No. 4, 424-426(Jul 1987). Contract AC04-76DP00789.

Self-consistent linearized augmented plane-wave calculations for H monolayers adsorbed on Pt(111), Ru(0001), Cu(111), and Cu(1 x 1)/Ru(0001) thin slabs predict the following: the H-atom equilibrium position on these substrates is generally in the face-centered cubic threefold hollow at a height above the surface where the clean-metal electron density is about 0.015 a.u. The symmetric

stretch (SS) frequency lies in the range 130—165 meV, and is about 30% greater than the asymmetric stretch (AS) frequency on the same substrate. These results contradict the mode assignments of Baro et al. [A. M. Baro, H. Ibach, and H. D. Bruchman, Surf. Sci. 88, 384 (1979)] for H/Pt(111) which were based on the observation of weak dipole scattering by the low-lying mode, and of Barteau et al. [M. A. Barteau, J. Q. Broughton, and D. Menzel, Surf. Sci. 133, 443 (1983)] for H/Ru(0001). The pairwise spring model of H—metal vibration invoked by these groups in support of their mode assignments neglects a major component of the H—metal interaction, that between the adsorbed H and the delocalized electrons of a metal surface. It is this interaction which is responsible for the fact that the frequency of the SS vibration is greater than that of the AS.

33258 **Surface science studies of the water—gas shift reaction on a model Cu(111) catalyst.** Campbell, C.T.; Koel, B.E.; Daube, K.A. (Chemistry Department, Indiana University, Bloomington, Indiana 47405). *Journal of Vacuum Science and Technology, A: Vacuum, Surfaces, and Films;* **5**: No. 4, 810-813(Jul 1987).

The water—gas shift reaction ($CO+H_2O \rightarrow CO_2+H_2$) is a step in many industrial processes, including ammonia and hydrogen production, with potential use in coal conversion schemes as well. It is traditionally achieved on copper- or iron-based catalysts. We have studied the kinetics of this reaction at pressures of —40 Torr on a Cu(111) single-crystal surface characterized by pre- and post-reaction surface analyses (Auger electron spectroscopy, x-ray photoelectron spectroscopy, low-energy electron diffraction). Specific rates, activation energies, and reaction orders are consistent with measurements on supported Cu catalysts. The results are interpreted in terms of a mechanism whereby the reaction rate is limited by the dissociative adsorption of water. We have also characterized the sulfur poisoning of this catalyst, which appears to occur by a simple site-blocking mechanism, where the reaction ensemble size is small (≦ 2 Cu atoms). Finally, we have found that Cs addition (from aqueous CsOH) enhances the reaction rate by a factor of 15. The structure of the catalyst surfaces will be discussed. After reaction, the unpromoted Cu surfaces were always completely metallic, and no surface oxygen was observable. This was true even if the Cu was heavily oxidized before reaction. With Cs addition, oxygen was always observable after reaction, and its level was roughly proportional to the Cs concentration, with an oxygen:cesium atomic ratio near unity. The mechanism of Cs promotion is discussed.

33259 **Structure and characterization of $(C_5H_5)_2Zr(H)BH_3CH_3$.** Kot, W.K.; Edelstein, N.M.; Zalkin, A. (Lawrence Berkeley Lab., CA). *Inorganic Chemistry;* **26**: No. 8, 1339-1341(22 Apr 1987).

During unsuccessful attempts to synthesize $CP^2Zr(BH_3CH_3)_2$ where Cp = eta ^{5}-C_5H_5, the monomeric hydride $Cp_2Zr(H)BH_3$ was isolated and characterized. Results of the ^{1}H NMR and ir spectra of both $Cp_2Zr(H)BH_3CH_3$ and the deuterated compound $Cp_2Zr(D)BD_3CH_3$ were used to characterize the monomeric hydride. 20 references, 1 figure, 5 tables.

33260 **Synthesis of aminooxycarbene complexes of iron with N-alkyl, -allyl, and -carbamoyl groups.** Johnson, L.K.; Angelici, R.J. (Iowa State Univ., Ames). *Inorganic Chemistry;* **26**: No. 7, 973-976(8 Apr 1987). Contract W-7405-ENG-82.

The aminoozycarbene complex $Cp(CO)_2Fe$(double bond $COCH_3CH_2NH)^+$ (I) is deprotonated by NaH to give $Cp(CO)_2Fe$(-$COCH_2CH_2N$)(II), whose nitrogen reacts with electrophiles. With Me_3O^+, II yields the N-methyl carbene $Cp(CO)_2Fe$(double bond $COCH_3CH_2NMe)^+$ (III). Reaction of II with allyl bromide yields the N-allyl carbene $Cp(CO)_2Fe$(double bond $COCH_2CH_2NCH_2CH$ double bond $CH_2)^+$ (IV), which under UV photolysis loses CO, allowing the allyl group to coordinate in $Cp(CO)Fe$(double bond $COCH_2CH_2NCH_2CH$ double bond $CH_2)^+$. The nitrogen of II adds to the carbon of methyl isocyanate; this is followed by isocyanate nitrogen attack on a coordinated CO ligand to give a carbamoylcarbene complex, $Cp(CO)Fe$(double bond $COCH_2CH_2NC$(double bond O)N(Me)C double bond O (VI). Protonation of VI cleaves the carbamoyl ligand to give the N carbamoyl carbene $Cp(CO)_2Fe$(double bond $COCH_2CH_2NC$(double bond O)NHMe)$^+$. These interesting new complexes are characterized by their ^{1}H and ^{13}C NMR and ir spectra. 20 references, 4 tables.

33261 **Cluster condensation reactions. Transformation of two triangular trinuclear clusters into a hexanuclear cluster containing a novel edge-fused bitetrahedral structure.** Adams, R.D.; Babin, J.E. (Univ. of South Carolina, Columbia). *Inorganic Chemistry;* **26**: No. 7, 980-984(8 Apr 1987).

The carbene-containing cluster complex $Os_3(CO)_9[C(H)NMe_2)\mu$-SMe)(μ-H) (1) was prepared in 56% yield from the reaction of $Os_3(CO)_{10}(\mu$-SMe)(μ-H) with $CH_2(NMe_2)_2$. UV irradiation of 1 yielded the complex $Os_3(CO)_9(\mu$-$CNMe_2)(\mu$-SMe)(μ-$H)_2$ (2) in 68% yield. Compound 2 contains a bridging (dimethylamino)carbyne ligand that was formed by an α-CH activation of the carbene ligand in 1. Thermal decarbonylation of 2 resulted in the formation of the hexaosmium cluster complex Os_6-$(CO)_{12}(\mu$-$CNMe_2)_2(\mu$-SMe)$_2(\mu$-$H)_2$ (3) in 65% yield. Compound 3 was characterized by a single-crystal X-ray diffraction analysis. The structure was solved by a combination of direct methods and difference Fourier techniques and was refined (2701 reflections) to the final values of the residuals R = 0.048 and R/sub w/ = 0.050. The structure consists of six osmium atoms arranged in the form of two tetrahedral clusters that have one edge in common. There are two bridging (dimethylamino)carbyne ligands and two triply bridging methanethiolato ligands that appear to serve as three-electron donors instead of the usual five-electron-donor configuration. 18 references, 3 figures, 4 tables.

33262 **Intramolar electron transfer in the reductive chromophore-quencher complex $[(bpy)Re(CO)_3(py\text{-}PTZ)]^+$.** Chen, P.; Westmoreland, T.D.; Danielson, E.; Schanze, K.S.; Anthon, D.; Neveux, P.E. Jr.; Meyer, T.J. (Univ. of North Carolina, Chapel Hill). *Inorganic Chemistry;* **26**: No. 7, 1116-1126(8 Apr 1987).

Three metal complexes containing the reductive quencher ligand py-PTZ, $[(bpy)Re(CO)_3(py\text{-}PTZ)]^+$ and [(bpy)$_2$Ru/sup II/L(py-PTZ)]/sup n+/ (where L = Cl^- (n = 1), PTZ = phenothiazine and acetonitrile (n = 2)), were prepared and their redox and spectral properties investigated. The chromophore-quencher complex have essentially the same photophysical properties as their corresponding pyridine analogues at 77K in a 4:1 (v/v)) ethanol/methanol glass, but their properties are profoundly different in fluid solution. For the Re complex in fluid solution excitation of the Re→π^*(bpy) metal to ligand charge-transfer (MLCT) chromophore at 355 nm is followed by rapid (<10 ns) appearance of transient absorption (TA) features at 350 and 500 nm consistent with formation of the charge-separated state [(bpy/sup.-/)Re(CO)$_3$(py-PTZ/sup.+)]/sup +*/. Picosecond TA experiments monitored at 500 nm show that the PTZ/sup .+/ site grows in within ~200 ps in polar organic solvents following laser excitation at 355 nm. The transient behavior observed leads to the conclusion that initial excitation of the MLCT chromophore is followed by rapid intramolecular electron-transfer quenching with k/sub q/(RT) = 4.8 x 10^9 s^{-1} in acetonitrile to give the charge-separated excited state [(bpy/sup .-)Re(CO)$_3$(py-PTZ/sup.+)]$^+$, which, in turn, decays to the ground state with k_2 = 4.0 x 10^7 s^{-1}. 36 references, 11 figures, 2 tables.

33263 **Hydrogen atom transfer in the oxidation of hydrogen peroxide by $[(bpy)_2(py)Ru/sup\ IV/\ double\ bond\ O]^{2+}$ and by $[(bpy)_2(py)Ru/sup\ III/\ single\ bond\ OH]^{2+}$.** Gilbert, J.; Roecker, L.; Meyer, T.J. (Univ. of North Carolina, Chapel Hill). *Inorganic Chemistry;* **26**: No. 7, 1126-1132(8 Apr 1987).

The oxidations of H_2O_2 and of HO_2^- by [(bpy)$_2$(py)Ru/sup III/(OH)]$^{2+}$ have been studied in aqueous solution. Rate constants and activation parameters for the oxidation of H_2O_2 by Ru/sup IV/ double bond O^{2+} are k(25°C) = 1.74 +/- 0.18, ΔH/sup double dagger/ = 6.0 +/- 0.3 kcal/mol, and ΔS/sup double dagger/ = -37 +/- 3 eu and by Ru/sup III/-OH^{2+} are k(25°C) = (8.09 +/- 0.27) x 10^{-3}, ΔH/sup double dagger/ = 12 +/- 2 kcal/mol, and ΔS/sup double dagger = -38 +/- 3 eu. H_2O/D^2O kinetic isotope ratios are, for Ru/sup IV /double bond O^{2+}, (k/sub H_2O/ ^{250}C/k/sub D_2O ^{250}C) = 22.0 +/- 1.2 and, for Ru/sup III/double bond OH^{2+}, (k/sub H_2O ^{250}C)/k/sub D^2O/ ^{250}C) = 16.2 +/- 0.7. From rapid-mixing experiments $[(bpy)_2(py)Ru/sup\ III/(OH)]^+$ is the initial

product of the oxidation of H_2O_2 by Ru/sup IV/ double bond O^{2+} rather than $[(bpy)_2(py)Ru/sup\ II/(OH_2)]^{2+}$, and it is proposed that oxidation of H_2O_2 by both Ru/sup IV/double bond O^{2+} and Ru/sup III/ single bond OH^{2+} occurs by H atom (1e-1 H^+) transfer. 38 references, 5 figures, 4 tables.

33264 **Determination of gold binding in an algal biomass using EXAFS and XANES spectroscopies.** Watkins, J.W. II; Elder, R.C.; Greene, B.; Darnall, D.W. (Univ. of Cincinnati, OH). *Inorganic Chemistry;* **26**: No. 7, 1147-1151(8 Apr 1987).

The alga Chorella vulgaris has been shown to have a high affinity for both gold(I) and gold(III) species in aqueous solutions. The accumulation of gold may approach 10% or more of the algae dry weight. X-ray absorption spectroscopy was used to investigate Au-algae samples prepared from aqueous solutions of the antiarthritic drug Myochrisine (sodium gold(I) thiomalate) and the gold complexes dicyanoaurate(I) and tetrachloroaurate(III). The oxidation state of the algae-bound gold and the structure of the gold coordination sphere that results upon binding have been determined. These results indicate that chemical reaction, not simply electrostatic interaction, is involved in the binding of the gold to the algae. The predominant oxidation state in algae complexes is Au(I). For samples derived from Au(I) complexes, the ligating atom appears to be sulfur while, for the samples prepared from Au(III), the product appears to bind Au(I) to a nitrogen moiety. 22 references, 2 figures, 2 tables.

33265 **Charge density wave as a probably cause for the phase transition at 125 K in the ternary molybdenum oxide $La_2Mo_2O_7$.** Whangbo, M.H.; Canadell, E. (North Carolina State Univ., Raleigh). *Inorganic Chemistry;* **26**: No. 6, 842-844(25 Mar 1987). Contract FG05-86ER45259.

Tight-binding band calculations were performed to investigate the electronic structure of $La_2Mo_2O_7$. The calculations reveal that $La_2Mo_2O_7$ is a pseudo-one-dimensional metal, and the two partially filled d-block bands it has lead to Fermi surface nesting with the wave vectors $q_1 \sim (0.5a^*, 0.73c^*)$ and $q_2 \sim (0.027c^*)$. The charge density waves (CDW) associated with these nesting vectors are expected to cause the phase transition of $La_2Mo_2O_7$, which occurs around 125 K. Furthermore, the bottom of an empty band lies above but very close to the Fermi level in $La_2Mo_2O_7$, so that the CDW's are expected to exhibit an interesting temperature dependence. 14 references, 2 figures.

33266 **Thermodynamics of electrolyte mixtures. Enthalpy and the effect of temperature on the activity coefficient.** Phutela, R.C.; Pitzer, K.S. (Lawrence Berkeley Lab., CA). *Journal of Solution Chemistry;* **15**: No. 8, 649-662(Aug 1986). Contract AC03-76SF00098.

The temperature dependence of the parameters for symmetrical mixing of ions of the same sign in the virial-coefficient (Pitzer) system are evaluated from literature data on heats of mixing in the presence of a common ion for 20 systems. The higher-order limiting law for symmetrical mixing is used in the form of an expression for the ionic strength dependence of the binary mixing parameter. Heats of mixing of the MX-NY type (without common ion) are calculated for eight systems from these parameters and found to be in excellent agreement with experimental values. Since pure-electrolyte parameters are required for the non-common-ion calculations, these are calculated as needed from recently published data.

33267 **Electrical conductances and ionization constants of salts, acids, and bases in supercritical aqueous fluids. I. Hydrochloric acid from 100° to 700°C and at pressures to 4000 bars.** Frantz, J.D.; Marshall, W.L. (Carnegie Institution of Washington, DC). *American Journal of Science;* **284**: No. 6, 651-667(Jun 1984). Contract W-7405-ENG-26.

The electrical conductances of 0.002, 0.005, and 0.010 molal hydrochloric acid solutions were measured at temperatures between 100° and 700°C and at pressures to 4000 bars. The results of the measurements were used to compute limiting equivalent conductances and ionization constants for the acid. From this and previous studies, limiting equivalent conductances were described to be a straight line function of density over moderate ranges of density and at constant density to be temperature independent above 350°C. The logarithms of the molar ionization constants were found to vary linearly with respect to inverse temperature and the logarithm of the density of water: Log K = -5.405 + 3874.9/T(°K) + 14.93 Log d/sub H_2O/. The results of the experiments were found to agree with those of Franck (1956b) within 0.25 logarithmic units (base 10) at densities between 0.60 and 0.80 g cm^{-3} but radically diverge as densities below 0.60 g cm^{-3}. Agreement between these data and those of Frantz, Popp, and Boctor (1981) are within one logarithmic unit.

33268 **Single crystals as model catalysts.** Goodman, D.W. (Surface Science Div., Sandia National Labs., Albuquerque, NM 87185). pp 171-188 of Catalysis of organic reactions. Augustine, R.L. New York, NY; Marcel Dekker Inc. (1984). (CONF-8405293—).

From 10. conference on catalysis of organic reactions; Williamsburg, VA, USA (7 May 1984).

An important new application of surface analytical methods is the study of catalytic reactions using well defined materials under conditions approaching those typically found in process environments. Recent studies combining kinetic and surface analytical studies have provided new information regarding the critical steps of certain reactions as well as the mechanisms of catalyst poisoning and promotion. These studies have demonstrated the appropriateness of metal single crystals as realistic models for a variety of catalytic reactions.

33269 **CO hydrogenation on alkali-promoted nickel catalysts.** Falconer, J.L.; Bailey, K.M.; Gochis, P.D. (Dept. of Chemical Engineering, Univ. of Colorado, Box 424, Boulder, CO 80309). pp 135-150 of Catalysis of organic reactions. Augustine, R.L. New York, NY; Marcel Dekker Inc. (1984). (CONF-8405293—).

From 10. conference on catalysis of organic reactions; Williamsburg, VA, USA (7 May 1984).

The modification of catalytic activity and selectivity by alkali promoters for CO hydrogenation on nickel was studied for four oxide supports. Steady-state kinetics were measured in a differential reactor (3:1 mixture of H/sub 2/:CO) with gas chromatographic detection. Temperature-programmed reaction (TPR) with mass spectrometric detection was carried out in excess hydrogen. In the differential reactor studies a potassium promoter decreased the activity but increased the olefin selectivity when nickel was supported on SiO/sub 2/, Al/sub 2/O/sub 3/, or TiO/sub 2/. The extent of activity decrease was a function of the support, however, and may be due to different distributions of promoter between the nickel and the supports. For Ni on SiO/sub 2/ . Al/sub 2/O/sub 3/ , overall activity increased and the selectivity to higher paraffins increased while olefin selectivity was unchanged.

4004 Electrochemistry

REFER ALSO TO CITATION(S) 33019, 33252

33270 **Photoelectrochemical characterization of several semiconducting compounds of palladium with sulfur and/or phosphorus.** Folmer, J.C.W.; Turner, J.A.; Parkinson, B.A. (Solar Energy Research Institute, Golden, CO). *Journal of Solid State Chemistry;* **68**: No. 1, 28-37(May 1987).

Semiconducting compounds of palladium with sulfur and/or phosphorus were prepared as crystals and their semiconducting and photoelectrochemical properties studied. The compounds include PdS, PdPS, $Pd_3(PS_4)_2$ and crystal growth was accomplished by chemical vapor transport with halogens and Bridgeman methods. Photoelectrochemical techniques were used to measure bandgap, transition type, doping level, majority carrier type, flatband potential, quantum yield for electron flow, and stability in a photoelectrochemical cell. The previously undetermined bandgap of PdP_2 is reported (1.08 eV, indirect).

33271 **Palladium/hydrogen membrane electrode for high temperature/high pressure aqueous solutions.** Nagy, Z.; Yonco, R.M. (Argonne National Lab., Materials Science and Technology Div. and Chemical Technology Div., Argonne, IL 60439-4837). *Journal of the Electrochemical Society;* **133**: No. 11, 2232-2235(Nov 1986). Contract W-31-109-ENG-38.

Several reference electrodes have been reported for high temperature/high pressure aqueous solutions, but none of them are fully satisfactory for fast relaxation measurements of electrode kinetics. The charged palladium electrode seems to fulfill all requirements at lower temperatures, but above 200°C the diffusional loss of hydrogen, into a solution not saturated with hydrogen, is very fast and the electrode must be recharged frequently. This problem can be overcome by use of a palladium-silver alloy membrane as an electrode with suitable hydrogen partial pressure on the dry side. Several electrodes of this type were built and tested over the temperature range from 100° to 300°C at a constant system pressure of 10,000 kPa and a hydrogen pressure range of 300-7000 kPa, in boric acid/lithium hydroxide solutions with a pH range of 5-11. The palladium membrane electrode was found to operate as a classical hydrogen electrode and is usable either as a pH electrode (combined with a pH-independent reference electrode) or as a reference electrode (in a constant pH solution).

4005 Photochemistry

REFER ALSO TO CITATION(S) 33270, 33318

33272 **Kinetic and internal energy distributions via velocity-aligned Doppler spectroscopy: The 193 nm photodissociation of H_2S and HBr.** Xu, Z.; Koplitz, B.; Wittig, C. (Chemistry Department, University of Southern California, Los Angeles, California 90089-0484). *Journal of Chemical Physics;* **87**: No. 2, 1062-1069(15 Jul 1987).

We report center-of-mass kinetic energy distributions for the 193 nm photodissociation of H_2S and HBr using the method of velocity—aligned Doppler spectroscopy. Nascent H atoms are detected by sequential two-photon photoionization via Lyman-α (121.6 nm + 364.7 nm), and internal SH($X\ ^3Pi$) and Br excitations are observed directly in the H-atom kinetic energy distributions. The kinetic energy resolution is much better than in "conventional" sub-Doppler resolution spectroscopy and results from detecting spatially selected species whose velocities are aligned with the wave vector of the probe radiation, k/sub probe/, thereby providing a kinetic energy distribution for a specific laboratory direction. This improved resolution is achieved in the present experiments by using pulsed, collimated, and overlapped photolysis and probe beams, but the vital aspect of the technique involves increasing the delay between the two lasers in order to discriminate against species having velocity components perpendicular to k/sub probe/.

4006 Radiation Chemistry

REFER ALSO TO CITATION(S) 32599, 32600, 32602, 32603, 32604, 32794, 33443, 33444, 33894, 33899, 33944, 34221, 34222

33273 **(INIS-mf—10889) International meeting on radiation chemistry and processing. Brdicka days 1986 - 20th Czechoslovak meeting. Abstracts.** (Ceskoslovenska Komise pro Atomovou Energii, Prague). Apr 1986. 85p. (CONF-8604318—Absts.). NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194.

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

The conference heard 76 papers; the abstracts of 74 of them were inputted in INIS. They deal with the basic principles and mechanisms of radiation chemistry, with radiolysis, radiation cross-linking of polymers, with methods and instruments for irradiation beam dosimetry, and with radiation application in the irradiation of foods and wastes.

33274 (INIS-mf—10889, pp 4) **Linking and dislinking reactions in irradiated polymers.** Babic, D.; Stannett, V. (Institut za Nuklearne Nauke Boris Kidric, Belgrade, Yugoslavia; North Carolina State Univ., Raleigh). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33275 (INIS-mf—10889, pp 6) **Stochastic simulation of primary processes in radiation chemistry.** Bartczak, M. (Institute of Applied Radiation Chemistry, Lodz, Poland). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33276 (INIS-mf—10889, pp 8) **Mechanisms of macroradical decay in polyolefins.** Bartos, J. (Research Institute of Rubber and Plastic Technology, Gottwaldov, Czechoslovakia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33277 (INIS-mf—10889, pp 10) **Radiation-chemical removal of NO/sub x/ by electron-beam irradiation of exhaust gases and model mixtures NO/sub x/-N_2-O_2-H_2O in gas phase at temperatures 298-523 K.** Belousova, E.V.; Dzantiev, B.G.; Larin, I.K.; Pavlova, S.U.; Sapozhnikov, D.N.; Sirotyuk, O.O.; Shvedchikov, A.P. (Institute Khimicheskoj Fiziki, Moscow, USSR). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33278 (INIS-mf—10889, pp 11) **Intramolecular three-electron bonds formation in methionyl homopeptides (di-L-Met, tri-L-Met).** Bobrowski, K.; Holcman, J. (Polska Akademia Nauk, Warsaw; Risoe National Lab., Roskilde, Denmark). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33279 (INIS-mf—10889, pp 12) **Radiation-induced transient styrene species in liquid and glassy freon-mixtures.** Boes, J.; Washio, M.; Togawa, S.; Tabata, Y. (Tokyo Univ., Japan). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33280 (INIS-mf—10889, pp 13) **Primary processes of stabilizer action in radiation-induced alkane oxidation.** Brede, O.; Hermann, R.; Mehnert, R. Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33281 (INIS-mf—10889, pp 16) **Some present and potential developments in radiation studies.** Charlesby, A. Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33282 (INIS-mf—10889, pp 17) **Alkylation and dimerisation of 2,6-substituted phenols induced by 60 Co gamma radiation in hydrocarbons.** Chutny, B.; Brodilova, J.; Pospisil, J. (Institut Hygieny a Epidemiologie, Prague, Czechoslovakia; Ceskoslovenska Akademie Ved, Prague, Czechoslovakia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33283 (INIS-mf—10889, pp 18) **Partial yields of Cl^- ions in two-phase systems with trichloromethane and tetrachloromethane.** Cech, R.; Racay, P.; Macasek, F. (Komenskeho Univ., Bratislava, Czechoslovakia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33284 (INIS-mf—10889, pp 19) **Partial yields of radiolytical products in two-phase systems with nitrobenzene.** Cefova, S.; Cech, R.; Macasek, F. (Komenskeho Univ., Bratislava, Czechoslovakia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33285 (INIS-mf—10889, pp 20) **Effect of some antioxidants on radiation crosslinking of polyethylene-vinylacetate.** Cernoch, P.; Vokal, A.; Ciperova, D. (Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33286 (INIS-mf—10889, pp 21) **Radiolysis of oxygenated aqueous solutions of tyrosine.** Cudina, I.; Josimovic, I. (Institut za Nuklearne Nauke Boris Kidric, Belgrade, Yugoslavia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33287 (INIS-mf—10889, pp 22) **Radiation-chemical aspects of chemistry on Precambrian earth and in cometary nuclei.** Draganic, I.G.; Draganic, Z.D. (Institut za Nuklearne Nauke Boris Kidric, Belgrade, Yugoslavia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33288 (INIS-mf—10889, pp 23) **Statistical theory of crosslinking and degradation of polymer chains in the pre-gel and post-gel states.** Dusek, K.; Demjanenko, M. (Ceskoslovenska Akademie Ved, Prague; Statni Vyzkumny Ustav Ochrany Materialu G.V. Akimova, Prague, Czechoslovakia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33289 (INIS-mf—10889, pp 24) **ESR studies on the gamma irradiation of modified polypropylene.** Hegazy, El-Sayed A.; Hassan Rezk, A.M. (National Research Centre, Cairo, Egypt). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33290 (INIS-mf—10889, pp 25) **Radiation destruction of cellulose. Effect of thermal and mechanical action.** Ershov, B.G. (Institute Fizicheskoj Khimii, Moscow, USSR). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33291 (INIS-mf—10889, pp 26) **Radiation produced hydrophylic gels as carriers for immobilized cells and enzymes.** Fiti, M.; Dragusin, M.; Moraru, R.; Ponta, C. (Institutul de Fizica si Inginerie Nucleara, Bucharest, Romania). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33292 (INIS-mf—10889, pp 28-29) **Exciton-quantum states of small semiconductor clusters. Part II - radiation chemistry of Q-states particles.** Fojtik, A. (Ceskoslovenska Akademie Ved, Prague). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33293 (INIS-mf—10889, pp 30) **Influence of ionizing radiation on some physico-chemical properties of various sorts of rubber.** Gavrila, D.; Paun, J. (Institutul Politehnic, Bucharest, Romania). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33294 (INIS-mf—10889, pp 31) **Radiolysis and pulse radiolysis of chlorinated phenols in aqueous solutions.** Getoff, N.; Solar, S. (Vienna, Univ., Austria). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33295 (INIS-mf—10889, pp 32) **Pulse radiolysis of the leucocyanide of malachite green dye in some polar solvents.** Grodkowski, J.; Stuglik, Z.; Wieczorek, G. (Institute of Nuclear Chemistry and Technology, Warsaw, Poland). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33296 (INIS-mf—10889, pp 33) **Radiolysis of aqueous solutions removing I_2 and CH_3I in nuclear power plants.** Habersbergerova, A.; Janovsky, I.; Pejsa, R. (Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33297 (INIS-mf—10889, pp 37) **Synergetic effects in thermo-irradiated polyethylene.** Ifrim, A.; Fireteanu, V.; Paun, J.; Mihalcea, I.; Jipa, S. (Institutul Politehnic, Bucharest, Romania; Institutul de Cercetari pentru Industria Electrotehnica, Bucharest, Romania). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33298 (INIS-mf—10889, pp 39) **Effect of radiation on chemical forms of iodine species in relation to nuclear reactor accidents.** Ishigure, K.; Shiraishi, H.; Okuda, H.; Fujita, N. (Tokyo Univ., Japan; Industrial Research Institute, Tokyo, Japan). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33299 (INIS-mf—10889, pp 42) **Radiolytic study of the antioxidant activity of vitamin E.** Jore, D.; Ferradini, C. Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33300 (INIS-mf—10889, pp 43) **Effect of oxygen on the radiolysis of tryptophan in acid media.** Josimovic, L.; Cudina, I.; Milosavljevic, B.H. (Institut za Nuklearne Nauke Boris Kidric, Belgrade, Yugoslavia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33301 (INIS-mf—10889, pp 44) **Radiation reduction of nitrate ions in concentrated aqueous solutions and in nitrate glasses.** Kalecinski, J. (Institute Niskich Temperatur i Badan Strukturalnych, Wroclaw, Poland). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33302 (INIS-mf—10889, pp 45) **Destruction of phenol at low phend concentration by ultraviolet light and gamma radiation.** Karaivanov, I.; Pumpalov, I. (Institute za Yadrena Izsledvaniya i Yadrena Energetika, Sofia, Bulgaria). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33303 (INIS-mf—10889, pp 46) **Nature of the electron- and gamma-induced radiation effects in power silicon semiconductor devices.** Kojecky, B.; Prasil, Z. (CKD Praha, Czechoslovakia; Ustav pro Vyzkum, Vyrobu a Vyuziti Radioisotopu, Prague, Czechoslovakia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33304 (INIS-mf—10889, pp 47) **Effect of antioxidants on the melting behavior of gamma irradiated polypropylene.** Kostoski, D.; Stojanovic, Z.; Gal, O.; Stannet, V. (Institut za Nuklearne Nauke Boris Kidric, Belgrade, Yugoslavia; North Carolina State Univ., Raleigh). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33305 (INIS-mf—10889, pp 49) **Mechanism and kinetics of primary processes induced by irradiation of noncrystalline solids.** Kroh, J. (Politechnika Lodzka, Poland). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33306 (INIS-mf—10889, pp 51-52) **Radiation and quantum yields of Cl^- in chlorobenzene, carbon tetrachloride and water two-phase systems.** Kuruc, J.; Hlatka, A.; Cech, R. (Komenskeho Univ., Bratislava, Czechoslovakia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33307 (INIS-mf—10889, pp 54) **Radiation induced cleaning of exhaust gases - current status, prospects and tasks to basic research.** Leonhardt, J.W. Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33308 (INIS-mf—10889, pp 57) **Enhanced free radical formation in irradiated polyethylene containing ZnO.** Ghassemi Mahidasht, G.R.; Gal, O.; Stojic, M. (Institut za Nuklearne Nauke Boris Kidric, Belgrade, Yugoslavia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33309 (INIS-mf—10889, pp 58) **Excited states formation in low temperature matrices - pulse radiolysis investigation.** Mayer, J.; Szadkowska-Nicze, M.; Kroh, J. (Politechnika Lodzka, Poland). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33310 (INIS-mf—10889, pp 61) **Radiation induced processes on the solid surfaces - general approach and outlook.** Nechaev, A. (International Atomic Energy Agency, Vienna, Austria). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33311 (INIS-mf—10889, pp 62) **Radiation promoted dissolution of metal oxides in mineral acids.** Nechaev, A.; Kal'azin, N. (International Atomic Energy Agency, Vienna, Austria; Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33312 (INIS-mf—10889, pp 67) **Effect of chain transfer agent on the chemical structure of chromium(III) crosslinked collagen - polymethyl methacrylate copolymers.** Pietrucha, K. (Politechnika Lodzka, Poland). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33313 (INIS-mf—10889, pp 70) **Modification of polypropylene fibers by preirradiation technique.** Pruzinec, J.; Manova, A.; Severa, J.; Knajfl, J. (Slovenska Vysoka Skola Technicka, Bratislava, Czechoslovakia; Vojensky Lekarsky Vyzkumny a Doskolovaci Ustav J.E. Purkyne, Hradec Kralove, Czechoslovakia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33314 (INIS-mf—10889, pp 74) **Electron beam curing of coatings.** Schmidt, J.; Mai, H. Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33315 (INIS-mf—10889, pp 77) **Electron beam curable coatings.** Takacs, E.; Czajlik, I.; Czvikovszky, T. (Research Institute for the Plastic Industry, Budapest, Hungary). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33316 (INIS-mf—10889, pp 81) **Determination of the concentration of elastically effective chains in radiation cross-linked low-density polyethylene.** Vokal, A. (Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33317 **Occurrence of superoxide radical ion in crystalline 12CaO $7Al_2O_3$ prepared via solid-state reactions.** Hosono, H.; Abe, Y. (Nagoya Institute of Technology, Japan). *Inorganic Chemistry;* **26**: No. 8, 1192-1195(22 Apr 1987).

Superoxide radical ion O_2^- is an active species of oxygen and is known to play important roles in many chemical reactions involving O_2. The formation of O_2^- on or in solid oxides is usually achieved with the aid of energetic photons such as uv, X-ray, or γ-ray radiation. It has been found that O_2^- occurs in the 12CaO $7Al_2O_3$ crystal prepared by the solid-state reaction between $CaCO_3$ and Al_2O_3 or $Al(OH)_3$ powder without any accompanying irradiation; the concentration of O_2^- goes up to ca. 4×10^{18} units/g.From the change in the line shape with temperature, the O_2^- is concluded to be included in the structural cavity inherent in the crystal lattice. A drastic reduction in the concentration of O_2^- on anion substitution and on heating under an oxygen-free atmosphere strongly suggests that the occurrence of O_2^- is closely related with free oxygen, which is a unique characteristic of the 12CaO $7Al_2O_3$ crystal. Such characteristics found for 12CaO $7Al_2O_3$ are analogous to those for ultramarine, $Na_8[Si_6Al_6O_{24}]S_2$. 25 references, 4 figures, 2 tables.

33318 **Photoirradiated and γ-ray-irradiated reactions of manganese(III, IV, V) tetraphenylporphyrins in 2-methyltetrahydrofuran. Reactions of azidomanganese(III) porphyrin.** Jin, T.; Suzuki, T.; Imamura, T.; Fujimoto, M. (Hokkaido Univ., Sapporo, Japan). *Inorganic Chemistry;* **26**: No. 8, 1280-1285(22 Apr 1987).

Manganese(III, IV) tetraphenylporphyrins Mn/sup III/(TPP)X(TPP = 5,10,15,20-tetraphenylporphinato; X = I, Br, Cl, N_3, NCS, OAc) and Mn/sup IV/(TPP)$(OCH_3)_2$ in 2-methyltetrahydrofuran (MeTHF) at room temperature were reduced to yield Mn/sup II/(TPP) by photoirradiation with visible light (440-750 nm) or by γ-ray irradiation. The photoirradiation of Mn/sup III/(TPP)N_3 in the rigid matrix at 77 K affords Mn/sup V/(TPP)N. Photochemically stable Mn/sup V/(TPP)N was reduced to Mn/sup II/(TPP) by γ-irradiation at room temperature. γ-irradiation of MeTHF solutions of Mn/sup III/(TPP)X at 77 K causes one-electron reduction to form the constrained complexes [Mn/sup II(TPP)X]$^-$. Warming the matrices after γ-irradiation formed Mn/sup II/(TPP), liberating ligand X^-. The near-infrared bands of Mn/sup III/(TPP)X red shift along with the shifts of the bands in the visible region by varying the ligand X. The characteristic bands of the constrained complex [Mn/sup II(TPP)X]$^-$ in the near-infrared region red shift in the order X = Cl > Br > I. The photoirradiation of Cr/sup III/(TPP)N_3 with visible light affords Cr/sup V/(TPP)N at room temperature and at 77 K. 39 references, 6 figures, 5 tables.

4007 Radiochemistry And Nuclear Chemistry

REFER ALSO TO CITATION(S) 32596

33319 **(FEI—1737) Study of ion exchange behaviour of some elements at phosphonic-acid cationite in diluted solutions of nitric acid.** Razbash, A.A.; Sevast'yanov, Yu.G. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.). 1985. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702263.

Ce(3, 4), Eu(3), Gd(3), Sm(3), Sc(3) distribution coefficients are determined in the macroporic phosphonic acid cationite KRF-20T-60 in nitric acid solutions in 0.1-2.0 M concentration interval using statistical method. A simple method of cerium-139 radionuclide extraction from the industrial lanthanum target is developed. The product yield made up more than 99%, specific activity - 2.37×10^9 Bq/mg, radiochemical purity - no less than 99.9%. 21 references.

33320 **(LBL—23367) Atom-at-a-time radiochemical separations of the heaviest elements: Lawrencium chemistry.** Hoffman, D.C.; Henderson, R.A.; Gregorich, K.E.; Bennett, D.A.; Chasteler, R.M.; Gannett, C.M.; Hall, H.L.; Lee, D.M.; Nurmia, M.J.; Silva, R.J. . (Lawrence Berkeley Lab., CA (USA); Lawrence Livermore National Lab., CA (USA)). Apr 1987. Contract AC03-76SF00098. 14p. (CONF-870430—7). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010258.

From International conference on methods and applications of radioanalytical chemistry; Kona, HI, USA (5 Apr 1987).

The isotope ^{260}Lr produced in reactions of ^{18}O with ^{249}Bk was used to perform chemical experiments on lawrencium to learn more about its chemical properties. These experiments involved extractions with thenoyl trifluoroacetate (TTA), ammonium alpha-hydroxyisobutyrate (HIB) elution from a cation exchange resin column, and reverse-phase chromatography using hydrogen di(2-ethylhexyl)orthophosphoric acid (HDEHP) to investigate the chemical properties of Lr. The results from the HIB elutions also give information about the ionic radius of Lr(III) which was found to elute very close to Er. An attempt to reduce Lr(III) was also made.

33321 **Synthesis and coordination chemistry of 2-(diethoxyphosphino)- and 2-(diphenylphosphino)pyridine N,P-dioxides. Crystal and molecular structures of Bis(nitrato)[2-(diethoxyphosphino)pyridine N,P-dioxide]dioxouranium(VI) and Bis(nitrato)[2-diphenylphosphino)pyridine N,P-dioxide]dioxouranium(VI).** McCabe, D.J.; Russell, A.A.; Karthikeyan, S.; Paine, R.T.; Ryan, R.R.; Smith, B. (Univ. of New Mexico, Albuquerque). *Inorganic Chemistry;* **26**: No. 8, 1230-1235(22 Apr 1987).

Bifunctional 2-(diphenylphosphino)pyridine N,P-dioxide, 2-[$(C_6H_5)_2P(O)$]C_6H_4NO (1), and 2-(diethoxyphosphino)pyridine N,P-dioxide, 2-[$(C_2H_5O)_2P(O)$]C_6H_4NO (2), were prepared by oxidation of the corresponding 2-(diphenylphosphino)pyridine P-oxide and 2-(diethoxyphosphino)pyridine P-oxide. The ligands were characterized by infrared and NMR spectroscopy, and the coordination chemistry toward $UO_2(NO_3)_2$ was examined. The complexes, $UO_2(NO_3)_2L$, were isolated and characterized, and the single-crystal X-ray diffraction analyses of $UO_2(NO_3)_2$\{2-[$(C_6H_5)_2P$(O)]C_6H_4NO\} (3) and $UO_2(NO_3)_2$\{2-[$(C_2H_5O)_2P$-(O)]C_6H_4NO] (4) were completed at 25°C. Crystal structures, molecular structures, and important bond distances are reported for complexes 3 and 4. 34 references, 2 figures, 8 tables.

4008 Combustion, Pyrolysis, And High-temperature Chemistry

33322 **(CFDU—86/9) Studies in unsteady flame propagation. Ph.D. thesis.** Wu, Z.Y. (Imperial Coll. of Science and Technology, London (UK)). Aug 1986. 307p. (ETN—87-99129). NTIS, PC A14/MF A01.

Unsteady flame propagation through a premixed combustible gas was studied. Photographs and qualitative descriptions of the flame wrinkling in a vented combustion chamber are presented. The single-fluid approach developed by Spalding and Awn (1978) is refined to simulate wrinkled laminar flames. Predictions are compared with photographs of propagating flames, and agreement in trends is found. The approach is used to obtain information on the flame wrinkling in simpler circumstances. The Spalding two-fluid model of turbulent combustion is applied to a one-dimensional, unsteady, confined, premixed flame with an idealized character. The experimentally observed features of combustion oscillations are plausibly simulated with qualitative realism. The buzz phenomenon is explained.

33323 **(CONF-870737—1) Shock tube studies of pyridine pyrolysis and their relation to soot formation.** Kern, R.D.; Yong, J.N.; Kiefer, J.H.; Shah, J.N. (New Orleans Univ., LA (USA). Dept. of Chemistry; Illinois Univ., Chicago (USA). Dept. of Chemical Engineering). 1987. Contract FG02-85ER13384;FG05-85ER13400. 9p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87006351.

From 16. shock tube symposium; Aachen, F.R. Germany (26 Jul 1987).

Shock tubes employing the laser extinction technique have been used to measure the soot yields of a wide variety of fuels; e.g., acetylene, allene, 1,3 butadiene, benzene, toluene, ethylbenzene. Aromatic compounds are known to exhibit relatively high soot yields whereas the soot yield for pyridine is extremely low. We have investigated the pyrolyses of the compounds listed above with two independent shock tube techniques, laser-schlieren densitometry and time-of-flight mass spectrometry, which furnish complementary information on the kinetics associated with these complex decompositions. We present here our results on the thermal decomposition of pyridine.

33324 **(SAND—86-1652C) Thermal ignition of Ti-based pyrotechnics II: Ti oxidation kinetics applied to analysis of slow ignition (DTA) experiments.** Erickson, K.L.; Rogers, J.W. Jr.; Skocypec, R.D. (Sandia National Labs., Albuquerque, NM (USA)). 1987. Contract AC04-76DP00789. 13p. (CONF-870668—4). NTIS, PC A02/MF A01; GPO Dep. File Number DE87008643.

From 3. international conference of the Groupe de Travail de Pyrotechnic Spatiale and 12. international pyrotechnics seminar; Paris, France (8 Jun 1987).

A series of slow thermal ignition experiments were conducted with titanium powders to evaluate previously developed titanium oxidation models. Comparison of experimentally observed and theoretically predicted powder response indicated that the oxidation models predicted reaction rates consistent with those required for ignition. However, reaction rates appear also to be dependent on additional mechanisms, which must be determined to develop generally applicable models.

33325 **(SAND—86-2589C) Mechanistic approach to predicting cook-off hazards: Reaction kinetics verification.** Skocypec, R.D.; Erickson, K.L.; Rogers, J.W. Jr.; Massis, T.M. (Sandia National Labs., Albuquerque, NM (USA)). 1987. Contract AC04-76DP00789. 19p. (CONF-8703134—2). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87007849.

From JANNAF propulsion systems hazards subcommittee; Arsenal, AL, USA (30 Mar 1987).

DTA/DSC (differential thermal analysis/differential scanning calorimetry) equipment is relatively inexpensive, readily available and can be used to test rate expressions once heat losses and samples are well-characterized. Heat transfer from the sample must be accounted for or sample ignition will be predicted for any temperature perturbation. For the preignition period, DTA/DSC techniques can be used to show consistency between rate expressions and "ignition temperature". However, the techniques are limited in identifying discrepancies in analytical models. The proposed oxidation mechanisms for titanium give "ignition temperatures" near experimental values, but the failure of predictions for smaller samples indicates that either additional processes must be accounted for in the experiment or that the oxidation models are incomplete. The disagreement appears not to result from the estimated uncertainties in oxidation rates, heat losses, or titanium depletion. Predicted oxidation rates give adequate energy for ignition, although other important processes seem to be involved. To resolve these processes, experiments using equipment designed to obtain transient information with multiple diagnostics is necessary.

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4202 Facilities And Equipment

REFER ALSO TO CITATION(S) 32543, 32543, 32792, 32846, 32847, 32851, 33016, 33151, 33624, 33970

33326 **(AD-A—179002/1/XAB) Protein-coated piezoelectric crystal detector. Contractor report, October 1985-March 1986.** Guilbault, G.G.; Lubrano, G.; Ngeh, J.; Jordan, J.; Foley, P. (Universal Sensors, Metairie, LA (USA)). Mar 1987. 39p. NTIS, PC A03/MF A01.

A research study was to be conducted to develop a piezoelectric crystal monitor for chemical agents using immobilized enzymes (cholinesterases) and an organophosphorus antibody as coatings. A monitor was to be designed that is small, simple to use, of low cost, and based on analytical methodology of suitable accuracy and sensitivity. The initial evaluation in Phase 1 was to performed using an organophosphorus chemical warfare simulant (diisopropyl methyl phosphonate) to ascertain the feasibility of the concept for military applications. The monitors were to be evaluated as to sensitivity, selectivity, response time, linear range, reproducibility, and lifetime.

33327 **(BDX—613-3742) Manual backup control system for dry glove box: Final report.** Domer, G.A. (Allied Corp., Kansas City, MO (USA). Bendix Kansas City Div.). Apr 1987. Contract AC04-76DP00613. 79p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE87009101.

The purpose of this project was to develop a manual control mode providing backup production capability of desiccant and hydrogen getter products in the event of computer failure. Providing backup manual control required decoupling of logic tasks from the computer. Decoupling was accomplished by integrating manual controls, a logic controller, and new computer hardware and software into the computer/manual control system.

33328 **(CEA-CONF—8383) Safety automatisms. Application to the ventilation of a hot laboratory.** Hayet, L.; Bourdinaud, P.; Lamotte, C. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Mar 1986. 19p. (In French). (CONF-8603159—2). NTIS (US Sales Only), PC A02/MF A01. File Number DE87751837.

From Meeting on protection, handling, detection and safety; Grenoble, France (12 Mar 1986).

The hot laboratories of the Nuclear Research Center of Saclay have been modified for working on more radioactive materials. After a brief description of the installations the safety is analyzed for different accidental situations and especially in case of fire.

33329 (CONF-850442—Summs., pp 103-105) **Core drilling technology fro ultradeep scientific holes.** Walton, M. (Minnesota Geologic Survey, St. Paul). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

Continuous core recovery has been identified as major requirement for scientific drilling if the goals of the Continental Scientific Drilling Program (CSDP) are to be achieved. The powerful rigs, tools and drilling methods developed by the petroleum industry for drilling to depths approaching 10,000 m in sedimentary basins are not well adapted to continuous core drilling and high-percentage core recovery, especially in the moderately hard to hard crystalline rocks which are expected to characterize some of the primary targets for ultradeep drilling. On the other hand, continuous core drilling, as practiced by the mineral exploration industry has had no economic incentive to go much beyond the practical

limits of mining at depths of less than 5000 m. There is growing interest on the part of both the petroleum and mineral exploration industries to adapt and combine their skills and technologies to develop continuous core drilling systems for soft as well as hard rocks at all drilling depths up to the ultradeep range of 10,000 to 15,000 m. The CSDP can provide a major impetus and incentive to this effort. This, in itself, will be a valuable spin-off of the CSDP.

33330 **(CONF-870567—2) Advances in concurrent computation for machine intelligence and robotics.** Barhen, J.; Einstein, J.R.; Jorgensen, C.C. (Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 15p. (CESAR—87/10). NTIS, PC A02. File Number DE87007666.

From 2. international conference on supercomputing; San Francisco, CA, USA (4 May 1987).

New methodologies must be developed for effective use of hypercube multiprocessors to meet the special requirements of Intelligent Robotics concerned with time-critical applications. The aim of this paper is to provide an overview of our initial experiences in this area, focusing on multiprocessor load-balance, mobile robotics and neural network algorithms.

33331 **(CONF-870584—5) Multi-sensor integration using concurrent computing.** Mann, R.C. (Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 12p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009676.

From Technical symposium southeast on optics, electro-optics and sensors; Orlando, FL, USA (17 May 1987).

This paper addresses methods for high- and low-level multi-sensor integration based on maintaining consistent labelings of features detected in different sensor domains. Implementation in a concurrent computing environment is discussed. 32 refs.

33332 **(CONF-870591—1) The implications of force reflection for teleoperation in space.** Draper, J.V.; Herndon, J.N.; Moore, W.E. (Human Machine Interfaces, Inc., Knoxville, TN (USA); Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 24p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87008585.

From Goddard conference on space applications of artificial intelligence and robotics; Greenbelt, MD, USA (1987).

This paper reviews previous research on teleoperator force feedback and reports results of a testing program which assessed the impact of force reflection on teleoperator task performance. Force reflection is a type of force feedback in which the forces acting on the remote portion of the teleoperator are displayed to the operator by back-driving the master controller. The testing program compared three force reflection levels: 4 to 1 (four units of force on the slave produce one unit of force at the master controller), 1 to 1, and infinity to 1 (no force reflection). Time required to complete tasks, rate of occurrence of errors, the maximum force applied to tasks components, and variability in forces applied to components during completion of representative remote handling tasks were used as dependent variables. Operators exhibited lower error rates, lower peak forces, and more consistent application of forces using force reflection than they did without it. These data support the hypothesis that force reflection provides useful information for teleoperator users. The earlier literature and the results of the experiment are discussed in terms of their implications for space-based teleoperator systems. The discussion describes the impact of force reflection on task completion performance and task strategies, as suggested by the literature. It is important to understand the tradeoffs involved in using telerobotic systems with and without force reflection. Force-reflecting systems are typically more expensive (in mass, volume, and price per unit), but they reduce mean time to repair and may be safer to use, compared to systems without force reflection.

33333 **(CONF-870591—2) Dynamic task allocation for a man-machine symbiotic system.** Parker, L.E.; Pin, F.G. (Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 19p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87008594.

From Goddard conference on space applications of artificial intelligence and robotics; Greenbelt, MD, USA (14 May 1987).

This paper presents a methodological approach to the dynamic allocation of tasks in a man-machine symbiotic system in the context of dexterous manipulation and teleoperation. This paper addresses symbiosis containing two symbiotic partners which work toward controlling a single manipulator arm for the execution of a series of sequential manipulation tasks. The proposed automatic task allocator used knowledge about the constraints/criteria of the problem, the available resources, the tasks to be performed, and the environment to dynamically allocate tasks to the man and the machine. The presentation of the methodology includes discussions concerning the characteristics of the man-machine symbiotic system, the interaction of the knowledge areas, the flow of execution, and the dynamic nature of the task allocation.

33334 **(DOE/CE/15262—T2) [Automatic filter network protection, failure detection and correction system and methodology]: Fourth quarter 1986, October-December 1986.** (Environmental and Electronic Technologies Corp., Carrollton, TX (USA)). 1986. Contract FG01-86CE15262. 15p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009628.

The White River Technologies (WRT) Capper is an automatic monitoring and sealing device for individual fabric filter dust tubes used in industrial baghouses. The Capper detects the failure of a fabric filter dust tube and automatically seals the opening at the tube sheet, preventing any further emissions. During the fourth quarter, preparation for the writing of the final report was begun. This mainly involved the testing of the Capper for different types of baghouses (jet pulse, plenum pulse). A proposal was submitted to Arizona Portland Cement (APC) that calls for the installation of 120 test units to be installed at the plant site during 1987. In addition to testing, the proposal should result in a purchase order for an additional 1440 units to be installed in the baghouse at the conclusion of successful test. A review was conducted of the cost associated with the production of the Capper at the end of this reporting quarter.

33335 **(EGG-M—28686) TMI-2 [Three Mile Island Nuclear Power Station] fuel canister and core sample handling equipment used in INEL hot cells.** McConnell, J.W. Jr.; Shurtliff, W.T.; Lynch, R.J.; Croft, K.M.; Whitmill, L.J.; Allen, S.M. (EG and G Idaho, Inc., Idaho Falls (USA)). 1987. Contract AC07-76ID01570. 8p. (CONF-870306—49). NTIS, PC A02. File Number DE87009399.

From Waste management '87; Tucson, AZ, USA (1 Mar 1987).

This paper describes the specialized remote handling equipment developed and used at the Idaho National Engineering Laboratory (INEL) to handle samples obtained from the core of the damaged Unit 2 reactor at Three Mile Island Nuclear Power Station (TM-2). Samples of the core were removed, placed in TMI-2 fuel canisters, and transported to the INEL. Those samples will be examined as part of the analysis of the TMI-2 accident. The equipment described herein was designed for removing sample materials from the fuel canisters, assisting with initial examination, and processing samples in preparation for detailed examinations. The more complex equipment used microprocessor remote controls with electric motor drives providing the required force and motion capabilities. The remaining components were unpowered and manipulator assisted.

33336 **(FNAL-TM—1432) Meson West beamline spoiler magnets electrical design and test report.** Visser, A.T. (Fermi National Accelerator Lab., Batavia, IL (USA)). 25 Nov 1986. Contract AC02-76CH03000. 30p. NTIS MF A01; 2; GPO Dep. File Number DE87008090.

This report describes the design and construction of five spoiler magnets installed in the secondary beamline to the Meson West Experimental Hall. Tests have been performed to measure the magnetic field in the steel as a function of the excitation current. B versus I curves for each spoiler are included. The leakage field in the beam pipe through the spoiler steel was too high. Magnetic shield and reduced excitation are used to lower this leakage field to acceptable levels.

33337 (HEDL-SA—3544-FP) Improved remote HEPA filtration development program. Wilson, C.E. III. (Hanford Engineering Development Lab., Richland, WA (USA)). Mar 1987. Contract AC06-76FF02170. 5p. (CONF-870301—21). NTIS, PC A02. File Number DE87008392.

From International topical meeting on remote systems and robotics in hostile environments; Pasco, WA, USA (29 Mar 1987).

This paper presents a summary of the prototype development and hot cell mock-up testing program undertaken to adapt a commercial remote HEPA filter housing for use in the Process Facility Modification Project (PFMP). This program was initiated in response to the project design criteria and documentation that required the air from the hot cell environment to be exhausted through three stages of HEPA filtration. Due to the anticipated quantity of radioactive contamination captured by the first stage of filters, it was determined that the first stage would need to be located in a remotely operated and maintained shielded cell adjoining the primary hot cell areas. Commercially available remote filtration equipment was evaluated and candidate unit was identified, which could be developed into a suitable filter housing. A candidate unit was obtained from Flanders Filters, Inc. and a series of hot cell mock-up tests were identified in the 305 facility at the Hanford site. The results of these tests, and further interaction with the vendor, led to a prototype remote filter housing which satisfied most PFMP criteria and proved to be significantly superior to existing commercial units for remote operation/maintenance.

33338 (INIS-mf—10628) Systems study 'Alternative Entsorgung'. Final report. Technical annex 1. Technical description of final storage containers for spent fuel elements. (Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.); Deutsche Gesellschaft fuer Wiederaufarbeitung von Kernbrennstoffen m.b.H. (DWK), Hannover (Germany, F.R.); Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)). Dec 1984. 213p. (In German). NTIS (US Sales Only), PC A10/MF A01. File Number DE87751908.

The technical development led to different final storage barrels, which satisfied the requirements during handling, during transport and in the final store. The planning bases of the final store for the final storage barrels with the requirements: - maximum transport weight 55 tonnes - maximum length 6.2 m together with other requirements, e.g. for the surface dose rate, lead to certain geometric dimensions. Other important characteristics of the final storage barrel are - the dry storage box for gastight enclosure of fuel elements - the actual final storage container, which protects against corrosion and load due to handling and rock pressure, and - the lost shielding, which makes direct handling possible. The dry storage box of the final storage barrel can accommodate a maximum of three complete fuel elements or the fuel rods of ten fuel elements. The engineering of both variants of packing the stored material was examined, where the container for fuel rods has clear advantages with regard to making use of the volume of the container.

33339 (INIS-mf—10884, pp 350-360) Containers for radioactive waste transport from Czechoslovak nuclear power plants to disposal sites. Vesely, P.; Bartos, V.; Nykl, L.; Marek, J.; Martinek, S. (Vyvojovy Zavod Uranoveho Prumyslu, Zbraslav nad Vltavou, Czechoslovakia). 1985. (In Czech). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780125. (CONF-8511274—Vol.2).

From Conference on processing of radioactive wastes from nuclear power facilities with LWR reactors; Luhacovice, Czechoslovakia (18 Nov 1985).

In the course of development work two types of containers were designed, i.e., containers for one or four drums. This was followed by the manufacture of functional samples and the containers were then optimized with regard to new data on the main types of wastes. Four-drum containers are designed for low-level radioactive wastes, single-drum containers are designed especially for medium-level radioactive sorbents. The building material is cast steel or cast iron for single-drum containers and rolled steel sheets for four-drum containers. Calculations of the container shielding have shown that the decisive criterion for assessing the necessary thickness of the shielding is the exposure rate at a distance of 2 m from the surface of the container. Also described are the specified tests for containers which include a test of the efficiency of shielding with a limit of 2 mSv/h for the dose rate on the container surface and of 0.1 mSv/h at a distance of 2 m, and a drop test from a height of 0.9 m for containers of more than 5000 kg and 1.2 m for containers of up to 5000 kg onto a hard surface in the most unfavourable position from the point of view of shielding efficiency reduction. (Z.M.).

33340 (K/ETAC—7) Ford Aerospace High-G Test Series II and III. Beshears, D.L. (Oak Ridge Gaseous Diffusion Plant, TN (USA)). Mar 1987. Contract AC05-84OT21400. 75p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87008355.

A series of tests is being conducted on electronic and optical components and assemblies to determine how well they operate after periods of constant high acceleration. This testing is being performed for the Ford Aerospace and Communications Corporation in support of the Air Force Space and Technology Center Sagittar Program. This final report documents the second and third series of tests which consisted of 47 test runs. The tests included the evaluation of some packaging techniques in an effort to extend the load capacity of a Panasonic lithium battery. Other tests conducted in Series II consisted of accelerating two receiver units (one with a gallium arsenide lens and the other with a zinc sulfide lens) to various G levels up to 120,281 G's. The qualification target for each of these units is 120,000 G's. In Test Series III, it was possible to further extend the Panasonic lithium battery life by not only encapsulating the battery in Castolite plastic, but also enclosing the entire assembly in an aluminum housing. The other components tested in Test Series III included two receiver units (one with a germanium lens and the other a 19-mm Kodak zinc sulfide lens), a 40-mm hybrid controller, a zinc sulfide lens assembly, an Altus lithium battery, a germanium filter, and two detectors. The qualification target for the 2 batteries and the 40-mm hybrid controller is 120,000 G's, while the qualification target for each of the other components tested in Series III is 140,000 G's.

33341 (N—87-20055, pp vp) Working group report on beam plasmas, electronic propulsion, and active experiments using beams. Dawson, J.M.; Eastman, T.; Gabriel, S.; Hawkins, J.; Matossian, J.; Raitt, J.; Reeves, G.; Sasaki, S.; Szuszczewicz, E.; Winkler, J.R. Oct 1986. NTIS, PC A20/MF A01. (NASA-CR—180231; JPL-PUB—86-49; NAS—1.26:180231; CONF-8609284—).

From Workshop on space technology plasma issues in 2001; Pasadena, CA, USA (24 Sep 1986).

The JPL Workshop addressed a number of plasma issues that bear on advanced spaceborne technology for the years 2000 and beyond. Primary interest was on the permanently manned space station with a focus on identifying environmentally related issues requiring early clarification by spaceborne plasma experimentation. The Beams Working Group focused on environmentally related threats that platform operations could have on the conduct and integrity of spaceborne beam experiments and vice versa. Considerations were to include particle beams and plumes. For purposes of definition it was agreed that the term particle beams described a directed flow of charged or neutral particles allowing single-particle trajectories to represent the characteristics of the beam and its propagation. On the other hand, the word plume was adopted to describe a multidimensional flow (or expansion) of a plasma or neutral gas cloud. Within the framework of these definitions, experiment categories included: (1) Neutral- and charged-particle beam propagation, with considerations extending to high powers and currents. (2) Evolution and dynamics of naturally occurring and man-made plasma and neutral gas clouds. In both categories, scientific interest focused on interactions with the ambient geoplasma and the evolution of particle densities, energy distribution functions, waves, and fields.

33342 (N—87-20055, pp vp) Working group 5: Measurements technology and active experiments. Whipple, E.; Barfield, J.N.; Faelthammar, C.G.; Feynman, J.; Quinn, J.N.; Roberts, W.; Stone, N.; Taylor, W.L. Oct 1986. NTIS, PC A20/MF A01. (NASA-CR—180231; JPL-PUB—86-49; NAS—1.26:180231; CONF-8609284—).

From Workshop on space technology plasma issues in 2001; Pasadena, CA, USA (24 Sep 1986).

Technology issues identified by working group 5 are listed. (1) New instruments are needed to upgrade the ability to measure plasma properties in space. (2) Facilities should be developed for conducting a broad range of plasma experiments in space. (3) The ability to predict plasma weather within magnetospheres should be improved and a capability to modify plasma weather developed. (4) Methods of control of plasma-spacecraft and spacecraft plasma interference should be upgraded. (5) The space station laboratory facilities should be designed with attention to problems of flexibility to allow for future growth. These issues are discussed.

33343 **(RFP—3995) Remote engineering progress report, January through December 1985.** Phillips, D.E. (Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant). 26 Jan 1987. Contract AC04-76DP03533. 46p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87009470.

This report summarizes progress in the Remote Engineering group's work at Rocky Flats from January to December 1985. Remote Engineering's goals in all 1985 projects were to help increase production capacity, reduce radiation exposure, improve operator safety, improve product quality, or alleviate material accounting errors. To convert manual operations to automated operations, Remote Engineering provided design, fabrication, and assembly of new equipment for varied Plant operations.

33344 **(SAND—86-2101C) Nonlinear structural system modelling.** Paez, T.L. (Sandia National Labs., Albuquerque, NM (USA)). 1987. Contract AC04-76DP00789. 20p. (CONF-870479—2). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87005884.

From AIAA/ASME structural dynamics and materials conference; Monterey, CA, USA (6 Apr 1987).

A model is proposed for nonlinear, harmonic generating structures. The model represents response at a specific frequency as a function of excitation at all frequencies. The model can be identified using a stationary random vibration experiment, and once identified, the model can be used to predict structural response to random excitation. The results of analyses performed on data obtained during a laboratory experiment are presented. The results demonstrate the feasibility of system identification and show that the model reasonably represents the behavior of certain nonlinear systems.

33345 **(SAND—86-2604C) The design and application of bi-directional velocity probes for measurements in large pool fires.** Kent, L.A.; Schneider, M.E. (Sandia National Labs., Albuquerque, NM (USA)). 1987. Contract AC04-76DP00789. 21p. (CONF-870556—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87003498.

From 33. annual international instrumentation symposium; Las Vegas, NV, USA (3 May 1987).

Sandia National Laboratories, thermal Test and Analysis Division, performs large (9 by 18 meters), open pool fire tests to simulate severe transportation accidents for evaluating shipping containers. In an effort to characterize the fire environment, a number of measurements were made in a 46-minute test which consumed approximately 12,800 gallons of JP-4 fuel. The measurements included temperatures, heat fluxes, and velocities. This report addresses the fabrication and calibration of the velocity probes, their use in measurements of flame velocities in the large pool fire test, and a comparison with a flame velocity correlation developed from measurements in smaller diffusion flames.

33346 **(SAND—87-0037) Apollo Ring Optical Switch.** Maestas, J.H. (Sandia National Labs., Albuquerque, NM (USA)). Mar 1987. Contract AC04-76DP00789. 41p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87010157.

An optical switch was designed, built, and installed at Sandia National Laboratories in Albuquerque, New Mexico, to facilitate the integration of two Apollo computer networks into a single network. This report presents an overview of the optical switch as well as its layout, switch testing procedure and test data, and installation.

33347 **(SAND—87-0401C) Strain gaging earth penetrators to provide dynamic force data.** May, R.A. (Sandia National Labs., Albuquerque, NM (USA)). 1987. Contract AC04-76DP00789. 7p. (CONF-870665—4). NTIS, PC A02. File Number DE87006126.

From Society for Experimental Mechanics spring meeting; Houston, TX, USA (14 Jun 1987).

During earth entry of high speed projectiles large, time-dependent forces are applied to the structure. In order to accurately model the response of these penetrators using both finite element methods and lumped mass-spring models, this force-time relationship must be quantified and used as an input for the analytical models. Two earth penetrators were internally strain gaged to obtain strains in the penetrator body which could be used to calculate the applied forces. The installation techniques used to install the gages 0.46 m (18 in) from the end of the 127 mm (5 in) inside diameter penetrator case are presented. Gage and adhesive selection as well as wiring and data acquisition techniques designed to survive the high inertial loads encountered during earth entry are discussed and preliminary results from the first test are shown.

33348 **(THE-R—814-D) Comparative testing of wind measuring equipment. Part 1: Inventory and selection.** Schotte, H. (Technische Hogeschool Eindhoven (Netherlands). Afdeling Technische Natuurkunde). Aug 1986. 72p. Consultancy Services Wind Energy Developing Countries (CWD), P.O. Box 85, 3800 AB Amersfoort, Netherlands.

This report is the result of the first part of a comparative study of wind measuring equipment. It contains an overview of commercially available systems, based on documentation. There has been made a division into four classes, according to the measuring possibilities of each instrument. The characteristics of the systems belonging to each class are listed in tables. After the documentation study quotations were asked for several systems, which has led to the selection of some equipment which will be purchased in order to carry out the second part of the study: the testing of interesting equipment. A list of manufacturers is included.

33349 **(UCRL—50025-87-1) Electronics Engineering Department EE technical review.** (Lawrence Livermore National Lab., CA (USA)). Apr 1987. Contract W-7405-ENG-48. 61p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87009361.

The EE Technical Review has two purposes - to inform readers of various activities within the Electronics Engineering Department and to promote the exchange of data. Separate abstracts were prepared for the individual papers of this report. (JDB)

33350 **(Y/CM—0078) Computer integrated manufacturing in the Oak Ridge Y-12 Plant: A technology baseline.** Harper, H.E. (comp.). (Oak Ridge Y-12 Plant, TN (USA)). Apr 1987. Contract AC05-84OS21400. 45p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87008690.

In order to improve productivity at the Y-12 Plant, CIM techniques are being implemented. The generic nature of the plant's CIM technology zones, product information, fabrication scheduling; manufacturing control programs, and product certification, are applicable to any production enterprise. The state of development of the plant's CIM program continues to mature, and the rewards have already been dramatic: computer-aided design has increased productivity by 250%; parametric design done on computer-aided systems has resulted in a 30:1 productivity gain; computer-aided design and manufacturing are responsible, in selected cases, for reducing the thickness of material blanks by 25%; dimensional inspection time has been cut in half; and productivity has increased 15% from use of direct numerical control. Full benefits from investments made in the early and mid 1980s will be realized by the end of the decade. The CIM program is projected to pay for itself by around 1992. The critical point for management to understand is that payback is not immediate. Certain major investments such as networking, central processors, and other "enabling" technologies require time for full operational capacity and resulting benefits to be achieved.

33351 Photon stimulated desorption from a vacuum chamber at the National Synchrotron Light Source. Kobari, T.; Halama, H.J. (MERL, Hitachi Ltd., Kandatsu, Tsuchiura, Ibaraki, 300 Japan). *Journal of Vacuum Science and Technology, A: Vacuum, Surfaces, and Films;* **5**: No. 4, 2355-2358(Jul 1987).

In our search for surfaces exhibiting the lowest photon stimulated desorption, we have exposed a 3-m-long beam tube to photons from the vacuum ultraviolet ring of the National Synchrotron Light Source having critical energy of —500 eV. Desorption of H_2, CH_4, CO, and CO_2, which are the main gas species, was studied as a function of the beam dose for the following surface treatments: standard chemical cleaning, Ar 10% O_2 glow discharge, N_2 glow discharge, and radio frequency glow discharge using O_2 disassociation. In addition, we measured the desorption as a function of vertical collimator position. N_2 glow discharge treatment yielded the lowest desorption.

33352 Evaluation of National Synchrotron Light Source beam line fast valve protection system. Foerster, C.L.; Larson, R. (Brookhaven National Laboratory, Upton, New York 11973). *Journal of Vacuum Science and Technology, A: Vacuum, Surfaces, and Films;* **5**: No. 4, 2401-2405(Jul 1987). Contract AC02-76CH00016.

A fast valve designed and produced at Brookhaven National Laboratory for the National Synchrotron Light Source (NSLS) was evaluated for operational and system parameters. A functional prototype of a typical beam line was built to measure fast valve protection for simulated experimental beam line catastrophic vacuum failures. The fast valve, which was designed to stop shock wave propagation due to in-rushing gas, yielded a nitrogen leak rate from 0.5 to 0.02 Torr l/s during the first 3 s of beam line vacuum failure. An UHV all-metal electropneumatic valve in series with the fast valve will close and seal in less than 3 s. The fast valve closure time which measured between 4.5 and 6.5 ms from initially sensing the shock wave to closure of the fast valve did not significantly change after vacuum bakeouts to 200 °C, repeated cycling, or shock wave operation. The fast valve firing circuit described sensed shock wave current from a miniature appendage ion pump and fired the fast valve in approximately 0.5 ms. Measurements were made for helium, nitrogen, argon, and air shock waves. Closing time and bounce were measured for several valves by sensing either laser or incandescant light during operation.

33353 Temperature compensated high-temperature/high-pressure Merrill—Bassett diamond anvil cell. Schiferl, D. (Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Review of Scientific Instruments;* **58**: No. 7, 1316-1317(Jul 1987).

A Merrill—Bassett diamond anvil cell for high-temperature/high-pressure studies up to 5 GPa at 1000 K and 13 GPa at 725 K is described. To maintain uniform, well-characterized temperatures, and to protect the diamond anvils from oxidation and graphitization, the entire cell is heated in a vacuum oven. The materials are chosen so that the pressure remains constant to within +-10% over the entire temperature range.

33354 Accordian-folded boot shield for flexible swivel connection. Hoh, J.C. (to Dept. of Energy, Washington, DC). US Patent 4,607,852. 26 Aug 1986. Filed date 19 Feb 1985. vp.

This patent describes an apparatus for connecting a first boot section to a second boot section, the first and second boots having openings therethrough, the second boot having at least two adjacent accordion folds at the end having the opening. The second boot is positioned through the opening of the first boot such that a first of the accordion folds is within the first boot and a second of the accordion folds is outside of the first boot comprising: first and second annular discs, the first disc being positioned within and across the first accordion fold, the second disc being positioned within and across the second accordion fold such that the first boot is moveably and rigidly connected between the first and second accordion folds.

33355 X, y, z positioner. Goers, G.F. (to Dept. of Energy). US Patent Application 6-894,523. 8 Aug 1986. 21p. Contract W-7405-ENG-48. DE87007206 NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87007206.

A three-axis control for precisely and conveniently adjusting items such as mirrors and lenses is disclosed. The adjuster apparatus includes a vertical stack of three rotatable adjusters. Rotation of the first effects vertical translation, whereas the second and third are eccentric assemblies which interact to effect movement along two angled axes perpendicular to the vertical axis.

33356 Source replenishment device for vacuum deposition. Hill, R.A. (to Dept. of Energy). US Patent Application 6-863,331. 15 May 1986. 27p. Contract AC04-76DP00789. DE87007248 NTIS, PC A03/MF A01; GPO Dep. File Number DE87007248.

A material source replenishment device for use with a vacuum deposition apparatus is described. The source replenishment device comprises an intermittent motion producing gear arrangement disposed within the vacuum deposition chamber. An elongated rod having one end operably connected to the gearing arrangement is provided with a multiarmed head at the opposite end disposed adjacent the heating element of the vacuum deposition apparatus. An inverted U-shaped source material element is releasably attached to the outer end of each arm member whereby said multiarmed head is moved to locate a first of said material elements above said heating element, whereupon said multiarmed head is lowered to engage said material element with the heating element and further lowered to release said material element on the heating element. After vaporization of said material element, second and subsequent material elements may be provided to the heating element without the need for opening the vacuum deposition apparatus to the atmosphere.

33357 Sintered composite filter. Bergman, W. (to Dept. of Energy). US Patent Application 6-859,166. 2 May 1986. 31p. Contract W-7405-ENG-48. DE87007242 NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87007242.

A particulate filter medium formed of a sintered composite of 0.5 micron diameter quartz fibers and 2 micron diameter stainless steel fibers is described. Preferred composition is about 40 vol.% quartz and about 60 vol.% stainless steel fibers. The media is sintered at about 1100°C to bond the stainless steel fibers into a cage network which holds the quartz fibers. High filter efficiency and low flow resistance are provided by the smaller quartz fibers. High strength is provided by the stainless steel fibers. The resulting media has a high efficiency and low pressure drop similar to the standard HEPA media, with tensile strength at least four times greater, and a maximum operating temperature of about 550°C. The invention also includes methods to form the composite media and a HEPA filter utilizing the composite media. The filter media can be used to filter particles in both liquids and gases.

33358 Magnetic refrigeration apparatus with belt of ferro or paramagnetic material. Barclay, J.A.; Stewart, W.F.; Henke, M.D.; Kalash, K.E. (to Dept. of Energy). US Patent Application 6-848,001. 3 Apr 1986. 23p. Contract W-7405-ENG-36. DE87007225 NTIS, PC A02/MF A01; GPO Dep. File Number DE87007225.

A magnetic refrigerator operating in the 12 to 77 K range utilizes a belt which carries ferromagnetic or paramagnetic material and which is disposed in a loop which passes through the center of a solenoidal magnet to achieve cooling. The magnetic material carried by the belt, which can be blocks in frames of a linked belt, can be a mixture of substances with different Curie temperatures arranged such that the Curie temperatures progressively increase from one edge of the belt to the other. This magnetic refrigerator can be used to cool and liquefy hydrogen or other fluids.

33359 Apparatus for and method of correcting for astigmatism in a light beam reflected off of a light reflecting surface. Sawicki, R.H.; Sweatt, W. (to Dept. of Energy). US Patent Application 6-800,631. 21 Nov 1985. 24p. Contract W-7405-ENG-48. DE87007280 NTIS, PC A02/M A01; 1; GPO Dep. File Number DE87007280.

A technique for adjustably correcting for astigmatism in a light beam is disclosed herein. This technique defines a flat, rectangular light reflecting surface having opposite reinforced side edges and which is resiliently bendable, to a limited extent, into different concave and/or convex cylindrical curvatures about a particular axis and provides for adjustably bending the light reflecting surface into one of different curvatures depending upon the astigmatism to be corrected and for fixedly maintaining the curvature selected. In the embodiment disclosed, the light reflecting surface is adjustably bendable into the selected cylindrical curvature by application of a particular bending moment to the reinforced side edges of the light reflecting surface.

33360 **Support mechanism for a mirrored surface or other arrangement and method.** Cutburth, R.W. (to Dept. of Energy). US Patent Application 6-796,464. 8 Nov 1985. 23p. Contract W-7405-ENG-48. DE87007271 NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87007271.

An adjustment mechanism such as a three point spherical mount for adjustably supporting a planer mirror or other type of arrangement relative to a plane defined by a given pair of perpendicular axes is described in this disclosure. This mechanism provides for positioning within the plane defined by the given pair of intersecting perpendicular axes. Limited positioning is possible about either of these axes and provides for a "non-floating" center of adjustment.

4203 Lasers

REFER ALSO TO CITATION(S) 34360, 34418

33361 **(AD-A—178992/4/XAB) Photochemistry of coumarin laser dyes. The role of singlet oxygen in the photo-oxidation of coumarin 311.** Trebra, R.J.; Koch, T.H. (Colorado Univ., Boulder (USA). Dept. of Chemistry and Biochemistry). 1986. 15p. NTIS, PC A02/MF A01.

Pub. in J. of Photochemistry, Vol. 35, 33-46(1986).

Coumarin 311 was shown to sensitize the formation of singlet oxygen, a reactive intermediate proposed to be responsible for degradation of coumarin dyes in dye lasers. The reactivity of Coumarin 311 and various oxidized states of Coumarin 311 with both the delta and sigma states of molecular oxygen was determined. Both singlet states of oxygen react predominantly at the dimethylamino substituent. Although singlet oxygen is formed in coumarin dye lasers and oxidizes the dyes, the products resulting from singlet-oxygen oxidation do not interfere with stimulated emission.

33362 **(IAEA-RL—136(Monaco/29)) Intercalibration of analytical methods on marine environmental samples. Results of MEDPOL-II exercise for the intercalibration of chlorinated hydrocarbon measurements on mussel homogenate (MA-M-2/OC).** (International Atomic Energy Agency, Monaco-Ville (Monaco). Lab. of Marine Radioactivity). Oct 1986. 15p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702278.

Mussels have been considered as good indicators of chlorinated hydrocarbon pollution of the marine environment and this led to the development of mussel watch programmes in many countries in the late seventies. These intercalibration exercises were arranged in order to increase the quality of analytical capabilities of environmental laboratories. The samples MA-M-2/0C of Mediterranean mussels with chlorinated hydrocarbon content were checked by 27 laboratories. It was judged highly suitable for these laboratories to have at their disposal a reference material made of mussel tissue with robust estimations of the true values with respect to several chlorinated hydrocarbons. Such a material would allow chemists to check the validity of new analytical procedures. 4 references, 4 tables.

33363 **(N—87-18067) Laser materials for the 0.67-microns to 2.5-microns range. Final Report, 23 September 1985-18 June 1986.** Toda, M.; Zamerowski, T.J.; Ladany, I.; Martinelli, R.U. (RCA Labs., Princeton, NJ (USA)). Mar 1987. 54p. (NASA-CR—4050; NAS—1.26:4050; RCA-PRRL—86-CR-4). NTIS, PC A04/MF A01.

Basic requirements for obtaining injection laser action in III-V semiconductors are discussed briefly. A detailed review is presented of materials suitable for lasers emitting at 0.67, 1.44, 1.93, and 2.5 microns. A general approach to the problem is presented, based on curves of materials properties published by Sasaki et al. It is also shown that these curves, although useful, may need correction in certain ranges. It is deduced that certain materials combinations, either proposed in the literature or actually tried, are not appropriate for double heterostructure lasers, because the refractive index of the cladding material is higher than the index of the active material, thus resulting in no waveguiding, and high threshold currents. Recommendations are made about the most promising approach to the achievement of laser action in the four wavelengths mentioned above.

33364 **(SAND—86-0344) Portable Nd Oscillator-Amplifier Laser (NOAL) System.** Landry, M.J.; Allen, D.L. (Sandia National Labs., Albuquerque, NM (USA)). Apr 1987. Contract AC04-76DP00789. 42p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87010154.

A neodymium glass oscillator-amplifier laser (NOAL) system has been installed in an instrumentation trailer. The NOAL system consists of an oscillator and three amplifiers with the laser rods made from ED-2 or phosphate glass. The NOAL system can deliver 500 J (ED-2) or 700 J (phosphate), depending on which glass is used, in a 500 μs pulse. The lasing wavelength is either 1062.3 nm (ED-2) or 1053.5 nm (phosphate). With either type of glass the output beam diameter can be as large as 44 mm with a ≤2.5-mrad beam divergence. The most reliable operation, which is obtained when only one of the two larger 45-mm-diameter amplifiers is used, delivers about 250 J (ED-2) or 450 J (phosphate) of energy per pulse. An extremely reliable NOAL system, capable of emitting about 800 J per pulse, could be assembled by placing two Lasermetrics oscillator-amplifier systems, each with a large-output Sandia amplifier, on the table in the trailer.

33365 (UCRL—52000-86-12, pp 28-32) **Optical systems for the Paladin experiment.** Dec 1986. NTIS, PC A04/MF A01. File Number DE87006586.

In Energy and technology review.

To demonstrate an amplifier for an optical free-electron laser, the authors must have an input beam of coherent light oscillating in the correct mode and appropriate optical diagnostic instrumentation. Most of the energy of the input beam must be in the fundamental TEM_{00} mode, a very stringent limit on beam quality. For the authors initial experiments with a short wiggler, they will need an input energy of about a megawatt. In later experiments in the high-intensity regime with wigglers up to 25 m long, they expect to use an input beam power of a gigawatt. The optical systems they have designed for the Paladin experiment will deliver a stable input beam and provide a flexible set of output diagnostic measurements.

33366 **(UCRL—94380) Modelling and simulation of large solid state laser systems.** Simmons, W.W.; Warren, W.E. (TRW, Inc., Redondo Beach, CA (USA); Lawrence Livermore National Lab., CA (USA)). 1986. Contract W-7405-ENG-48. 10p. (CONF-860366—13). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009586.

From SPIE technical symposium on applications of artificial intelligence; Orlando, FL, USA (31 Mar 1986).

The role of numerical methods to simulate the several physical processes (e.g., diffraction, self-focusing, gain saturation) that are involved in coherent beam propagation through large laser systems is discussed. A comprehensive simulation code for modeling the pertinent physical phenomena observed in laser operations (growth of small-scale modulation, spatial filter, imaging, gain saturation and beam-induced damage) is described in some detail. Comparisons between code results and solid state laser output performance data are presented. Design and performance estimation of the large Nova laser system at LLNL are given. Finally, a global design rule for large, solid state laser systems is discussed.

33367 **Small-signal analysis of the induced-resonance electron-cyclotron maser.** Riyopoulos, S.; Tang, C.M.; Sprangle, P. (Plasma Theory Branch, Plasma Physics Division, Naval Research Laboratory, Washington, DC 20375-5000). *Physical Review [Section] A: General Physics;* **36**: No. 1, 197-201(1 Jul 1987).

The induced-resonance electron-cyclotron maser operates at Doppler-upshifted frequencies $\omega \cong \gamma^2 \Omega_0$, with γ the relativistic factor and $\Omega_0 = eB_0/\gamma mc$. In addition, the mechanism is insensitive to the beam thermal spreads when the index of refraction n = k/ sub z/c/ω is properly adjusted. A set of simplified equations, describing the electron dynamics near the axis of the configuration, is derived in the limit of small Larmor radius. The linear efficiency is derived for radiation having a Gaussian profile and propagating at an angle α relative to a constant external magnetic field. The start-up current for operation in the submillimeter regime is well within the capabilities of today's long-pulse relativistic electron beams.

33368 **Wideband spectrograph for free-electron laser experiments.** Kulke, B.; Burns, M.J.; Orzechowski, T.J. (Lawrence Livermore National Laboratory, Livermore, California 94550). *Review of Scientific Instruments;* **58**: No. 7, 1153-1157(Jul 1987). Contract W-7405-ENG-48.

We have designed, calibrated, and deployed an electron spectrograph to measure the effect of the free-electron laser interaction on the relativistic electron beam in an FEL. The spectrograph spans a wide energy range (ΔE/E—1) and is designed for electron energies from 2 to 4 MeV. Calibration was achieved using a 2—6-keV proton beam, and the measured dispersion is in good agreement with the value predicted from ray tracing. The spectrograph has been used to estimate the extraction efficiency, and the results agree within 25% with the observed microwave power levels.

33369 **High average power harmonic generation.** Eimerl, D. (Nonlinear Optical Materials Group, Lawrence Livermore National Lab., Livermore, CA 94550). *IEEE (Institute of Electrical and Electronics Engineers) Journal of Quantum Electronics;* **QE-23**: No. 5, 575-592(May 1987). Contract W-7405-ENG-48.

High average power frequency conversion using solid-state nonlinear materials is discussed. Recent laboratory experience and new developments in design concepts show that current technology, a few tens of watts, may be extended by several orders of magnitude. For example, using KD*P, efficient doubling (> 70 percent) of Nd:YAG at average powers approaching 100 KW is possible; for doubling to the blue or UV regions the average ower may approach 1 MW. Configurations using segmented apertures permit essentially unlimited scaling of average power. High average power is achieved by configuring the nonlinear material as a set of thin plates with a large ratio of surface area to volume, and cooling the exposed surfaces with a flowing gas. The design and material fabrication of such a harmonic generator is well within current technology.

33370 **(ESA-TT—74) Population inversions of quantum levels in space and time-dependent fast recombining plasmas. Theory of the recombination laser.** Bohn, W.L. (European Space Agency, 75 - Paris (France)). Nov 1986. Translation of Besetzungsinversion von Quantenniveaus in Raeumlich und Zeitlich Schnell Veraenderlichen Rekombinierenden Plasmen. Theorie des Rekombinationslasers DFVLR, Stuttagart, West Germany, report DFVLR-FB-85-47, Jul. 1985. (DFVLR-FB—85-47; ETN—87-99427). 140p. NTIS, PC A07/MF A01; original report in German available from DFVLR, Cologne, West Germany DM 40.50.

A theory of ionization and recombination for optically thin and thick plasmas was derived in order to calculate the population densities of excited quantum levels in hydrogen and hydrogen-like ions. Criteria for the generation of population inversions were established within a quasi-static approximation leading to a theory of the recombination laser. A hydrodynamic computer code for one-dimensional plasma flows which describes the transient properties of population inversions was developed. Laser transitions in a plasma nozzle flow, in the plasma expansion into vacuum, and in the plasma expansion in the presence of a background gas are described in good agreement with available experimental data. Inversions leading to XUV-laser transitions are emphasized.

33371 **A high average power pockels cell.** Daly, T.P. (to Dept. of Energy). US Patent Application 6-827,703. 10 Feb 1986. 15p. Contract W-7405-ENG-48. DE87007296 NTIS, PC A02/MF A01; GPO Dep. File Number DE87007296.

A high average power pockels cell is disclosed which reduced the effect of thermally induced strains in high average power laser technology. The pockels cell includes an elongated, substantially rectangular crystalline structure formed from a KDP-type material to eliminate shear strains. The X- and Y-axes are oriented substantially perpendicular to the edges of the crystal cross-section and to the C-axis direction of propagation to eliminate shear strains.

33372 **Lifetime studies of a commercial XeCl excimer laser.** Balog, G.; Sze, R.C. pp 713-721 of Lasers '85; Proceedings of the Eighth International Conference, Las Vegas, NV, Dec. 2-6, 1985. Wang, C.P. McLean, VA; STS Press (1986). (CONF-851208—).

From 8. international conference on lasers; Las Vegas, NV, USA (2 Dec 1985).

A procedure for the systematic evaluation of the long-term performance of laser devices, including measurements of transient absorption, the continuous power, and the combined absorption by the optics and the laser gas mix, was developed and applied to a commercial xenon chloride excimer laser. Based on the evaluation, modifications incorporating particulate filtration, halogen donor makeup, optics flushing with a circulated laser gas mix, and cryogenic gas treatment were made. The modifications extended the lifetime of a single laser gas fill beyond that of the unmodified laser, while maintaining the laser at a power level within 10 percent of the initial value. 5 references.

33373 **Performance of a 250-Hz, 100-W alexandrite laser system.** Jones, J.E.; Dobbins, J.D.; Butler, B.D.; Hinsley, R.J. pp 738-743 of Lasers '85; Proceedings of the Eighth International Conference, Las Vegas, NV, Dec. 2-6, 1985. Wang, C.P. McLean, VA; STS Press (1986). (CONF-851208—).

From 8. international conference on lasers; Las Vegas, NV, USA (2 Dec 1985).

The operational characteristics and reliability of an alexandrite laser system which consists of two 125-Hz, 50-W alexandrite lasers are described. The configuration of the two laser rods, which are 6.35 mm in diameter and 10.6 cm long, and which produce a system output of 250 Hz are discussed. The energy and temporal, spectral, and spatial properties of the laser system are examined. Consideration is given to maintaining the stability of the laser system and system components damage.

33374 **Design and performance of large area monolithic electron guns for the Aurora KrF laser system.** Rosocha, L.A.; Kang, M.; Romero, V.O.; Van Haaften, F.W.; Brucker, J.P. (Univ. of California, Los Alamos National Lab., P.O. Box 1663, Los Alamos, NM 87545). pp 571-574 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—).

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

Aurora is an inertial confinement fusion laser system using optical angular multiplexing and a chain of four cold cathode electron beam driven KrF laser amplifiers to produce 10 to 20 kJ for optical energy. The electron guns make use of graphite felt cathodes that range in emission area from 1,200 cm/sup 2/ to 20,000 cm/sup 2/ and are typically driven by Marx generator charged waterline PFLs of 2.7 Ω impedance that produce 650 ns pulses when switched by SF/sub 6/ insulated trigatrons. Typical cathode voltages are 300 kV to 700 kV with cathode current densities of 15 to 25 A/cm/sup 2/. In this paper, the authors concentrate on the major electron gun components of these amplifiers: Marx generators, water PFLs, output switches, feedthrough bushings, cold cathode diodes, and magnets. All of the Aurora e-guns are similar, except that the SAM does not employ a PFL and the LAM uses two electron guns, each driven by two PFLs in parallel. The design and performance of the electron guns are described in detail.

4204 Heat Transfer And Fluid Flow

REFER ALSO TO CITATION(S) 32471, 32523, 32833, 32834

33375 **(DOE/ER/13556—1) Gas-liquid flow in pipelines: Progress report for period July 1, 1986-January 1, 1987.** Hanratty, T.J. (Illinois Univ., Urbana (USA)). Jan 1987. Contract FG02-86ER13556. 6p. NTIS, PC A02/MF A01; GPO Dep. File Number DE87008941.

This project was initiated on July 1, 1986 to obtain a physical understanding of the flow patterns and the phase interactions that exist for gas/liquid flow in long pipelines. Two facilities are being used: One contains horizontal pipelines of 1 inch, 2 inches and 4 inches. The other has vertical pipes with diameters of 3/4 inch, 1 1/2 inches and 2 1/4 inches. The principal laboratory accomplishments during the first six months of the grant have been the renovation of the horizontal facility so that it can be tilted slightly and be used with more viscous liquids, and the development of a greatly improved method to measure rates of atomization and deposition for vertical annular flows. Measurements of atomization and deposition obtained for air-water flow in a vertical 3/4 inch pipe are much higher quality than presently available in the literature. They support the notion that there is a critical film flow rate below which atomization does not occur and provide the most reliable measurements of this critical flow. A surprising aspect of the measurements of the rate of deposition is the demonstration that the rate of deposition is independent of droplet concentration at large droplet concentrations.

33376 **(DOE/PC/80511—T7) Hydrodynamics, mixing, and segregation in gas fluidized beds: Technical progress report, 22 January 1987 to 21 April 1987.** Chen, M.M.; Chao, B.T. (Illinois Univ., Urbana (USA). Dept. of Mechanical and Industrial Engineering). 1987. Contract FG22-85PC80511. 13p. NTIS, PC A02/MF A01. File Number DE87010009.

This technical progress report covers the progress made in the project entitled "Hydrodynamics, Mixing, and Segregation in Gas Fluidized Beds," under the Grant No. FG22-85PC80511 during the period 22 January through 21 April 1987. Efforts during this period have focused on the following areas. (1) A new method of processing the single particle tracking data have been developed. The method is based on area averages rather than volume averages and it is capable of providing complete information on the turbulent stresses. In contrast, previous methods were able to produce only selected components of the stresses. (2) Examinations of the power spectrum of the multiple particle tracking data have been carried out, in an effort to obtain a mechanistic understanding of the nature of solids motion in the bed. Of particular interest is the fact that the spectrum revealed the presence of persistent intrinsic frequencies which are independent of the particle size and the fluidization velocity. 4 figs., 1 tab.

33377 **(FEI—1716) Conservative model of interchannel pulsations.** Yarkin, A.N.; Kulikov, B.I.; Shvidchenko, G.I. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.). 1985. 30p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702262.

Nonlinear mathematical model of interchannel pulsations (ICP) in the system of two identical steam generating channels is suggested. To construct ICP domain boundaries and determine ICP period by formulae following from the model it is sufficient to known static characteristics of one isolated channel of the system. Results of comparing theoretical conclusions with the experimental data are presented. Their satisfactory coincidence is noted. 19 references, 7 figures.

33378 **(FEI—1760) Two-cell model use for heat transfer crisis calculation in tubes with non-uniform in perimeter heat release.** Pomet'ko, R.S.; Zisman, A.S.; Perepelitsa, N.I. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.). 1986. 15p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702265.

The results of theoretical and experimental investigations into heat transfer crisis in tubes with non-uniform heat release over the perimeter in the freon-12 flow have been considered. Experiments have been carried out in the pressure region of 1.06-2.3 MPa (that is equivalent to 7-14 MPa water pressure) and in the region of flow rates from 750 to 2400 kg/m²xs. The void fraction in heat transfer crisis has changed from -0.3 to 0.7. The interaction coefficient is introduced on the basis of the analysis of the results obtained, and its dependence on mode parameters is obtained. Application of the relations suggested is shown to permit to increase essentially calculation accuracy in comparison with the hypothesis of the local or average density of a critical heat flux. 4 references, 11 figures.

33379 **(N—87-17003) Measurement of heat transfer and pressure drop in rectangular channels with turbulence promoters. Final report.** Han, J. C.; Park, J. S.; Ibrahim, M. Y. (Texas A and M Univ., College Station (USA)). Sep 1986. 203p. (NASA-CR—4015; E—3164; NAS—1.26:4015). NTIS, PC A10/MF A01.

Periodic rib turbulators were used in advanced turbine cooling designs to enhance the internal heat transfer. The objective of the present project was to investigate the combined effects of the rib angle of attack and the channel aspect ratio on the local heat transfer and pressure drop in rectangular channels with two opposite ribbed walls for Reynolds number varied from 10,000 to 60,000. The channel aspect ratio (W/H) was varied from 1 to 2 to 4. The rib angle of attack (alpha) was varied from 90 to 60 to 45 to 30 degree. The highly detailed heat transfer coefficient distribution on both the smooth side and the ribbed side walls from the channel sharp entrance to the downstream region were measured. The results showed that, in the square channel, the heat transfer for the slant ribs (alpha = 30 -45 deg) was about 30% higher that of the transverse ribs (alpha = 90 deg) for a constant pumping power. However, in the rectangular channels (W/H = 2 and 4, ribs on W side), the heat transfer at alpha = 30 -45 deg was only about 5% higher than 90 deg. The average heat transfer and friction correlations were developed to account for rib spacing, rib angle, and channel aspect ratio over the range of roughness Reynolds number.

33380 **(N—87-18786) Liquid sheet radiator.** Chubb, D.L.; White, K.A. III. (National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center). 1987. 13p. (NASA-TM—89841; E—3497; NAS—1.15:89841; CONF-870623—7). NTIS, PC A02/MF A01.

From 22. AIAA thermophysics conference; Honolulu, HI, USA (8 Jun 1987).

A new external flow radiator concept, the liquid sheet radiator (LSR), is introduced. The LSR sheet flow is described and an expression for the length/width (l/w), ratio is presented. A linear dependence of l/w on velocity is predicted that agrees with experimental results. Specific power for the LSR is calculated and is found to be nearly the same as the specific power of a liquid droplet radiator, (LDR). Several sheet thicknesses and widths were experimentally investigated. In no case was the flow found to be unstable.

33381 **(SAND—87-0572C) Transonic nozzle flow instability due to shock wave/condensation front interaction.** Evans, N.A. (Sandia National Labs., Albuquerque, NM (USA)). 1987. Contract AC04-76DP00789. 11p. (CONF-870622—2). NTIS, PC A02. File Number DE87006898.

From 19. fluid dynamics, plasma dynamics, and laser conference; Honolulu, HI, USA (8 Jun 1987).

A physically-based postulate is offered for the occurrence of a new type of transonic nozzle flow instability when operation is such that a condensation front interacts with a separate gasdynamic shock wave. A simplified, but reasonable, analysis is described and shows support for the postulate. Finally, results are presented from a systematic experimental investigation in steam flow which confirms the occurrence of the instability. With reduced wall boundary layers, the intensity and spatial extent of the shock wave/condensation front interaction (based on the rms value of unsteady wall pressure measurements) was 60% greater than the corresponding shock wave/boundary layer interaction in superheated flow.

33382 **(UCID—20997) ONED: one-dimensional, steady, combined mode heat transfer.** Colwell, R.G.; Blackketter, D.O. (Lawrence Livermore National Lab., CA (USA)). 25 Feb 1987. Contract W-7405-ENG-48. 38p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87007524.

This report describes a set of computer programs used to solve one dimensional heat conduction problems using cartesian coordinates. One program writes equations which model a user-defined problem. The equations are written to a file that is accessed by the equation solving program. This program uses Newton's method and user input data to generate solutions.

33383 **Fluidization phenomena in a large jetting fluidized bed.** Yang, W.C.; Ettehadieh, B.; Anestis, T.C.; Gizzie, R.E.; Haldipur, G.B. (KRW Energy Systems Inc., Madison, PA). pp 95-102 of Proceedings of fluidization V. Ostergaard, K.; Sorensen, A. New York, NY; Engineering Foundation (1986). (CONF-860504—).

From 5. international conference on fluidization; Elsinore, Denmark (18 May 1986).

Jet penetration, bubble dynamics, gas mixing, particle mixing, solid circulation, and particle separation were studied in a 3-meter diameter by 10-meter high cold flow model of semicircular cross-section. Two jet nozzle assemblies of 25cm and 41cm in diameter were employed with jet velocities ranging from 15 to 60 m/s and solid feed rates, from 0 to 4550 kg/hr.

33384 **Shallow fluid beds of master beads.** Yang, J.; Liu, Y.A.; Squires, A.M. (Dept. of Chemical Engineering, Virginia Polytechnic Institute and State Univ., Blacksburg, VA 24061). pp 409-416 of Proceedings of fluidization V. Ostergaard, K.; Sorensen, A. New York, NY; Engineering Foundation (1986). (CONF-860504—).

From 5. international conference on fluidization; Elsinore, Denmark (18 May 1986).

Shallow fluid beds of spherical "Master Beads" (ca. 86% alumina) display nine "Types," of which seven may be useful. Coefficients of heat transfer from a heating tube are highest when the tube is situated near the surface of beds of "Types" that display a dense phase. A relatively high standard deviation of solid volume-fraction over time near the surface attests the greater solid "activity" in this region.

33385 **Shallow vibrated beds of master beads.** Sprung, R.; Thomas, B.; Liu, Y.A.; Squires, A.M. (Dept. of Chemical Engineering, Virginia Polytechnic Institute and State Univ., Blacksburg, VA 24061). pp 417-424 of Proceedings of fluidization V. Ostergaard, K.; Sorensen, A. New York, NY; Engineering Foundation (1986). (CONF-860504—).

From 5. international conference on fluidization; Elsinore, Denmark (18 May 1986).

Arrangements for studying heat transfer, solid movement pattern, and instantaneous floor pressure in shallow "vibro-beds" are described; also, for phase-shift photography of such beds. At ca. 25 Hertz and a maximum upward acceleration of ca. 5 g's transfer of heat from a single hot tube to 177 μm "Master Beads" can attain a value beyond 450 watts/m/sup 2/-K. This result can be understood qualitatively, in relation to results for coarser and finer "Master Beads," in light of the fraction of the time the tube spends in contact with different solids and patterns of movement in the solids.

4205 Materials Testing

REFER ALSO TO CITATION(S) 32754, 32761, 32762, 32763, 32766, 32832, 32835, 32838, 32841, 32843, 32880, 33164, 33214, 33492, 34390

33386 **(BDX—613-3748) Feasibility study for using liquid springs to produce mechanical shock pulses: Topical report.** Thorne, L.F. (Allied Corp., Kansas City, MO (USA). Bendix Kansas City Div.). Apr 1987. Contract AC04-76DP00613. 35p. NTIS, PC A03/MF A01; GPO Dep. File Number DE87009099.

Equations have been developed to predict the performance of liquid springs when used on shock machines to perform low amplitude, long duration shock pulses. Graphs prepared from the equations show the increase in equipment capability that is possible for six candidate machines equipped with liquid spring devices. Programs have been written for a programmable calculator to provide an efficient means of determining the design details for liquid springs with which specified tests can be performed on selected machines. Two 20,000 psi pressure cylinders have been purchased as the basic element for fabricating two liquid spring devices which will be used to study liquid spring performance and to verify design theory.

33387 **(DOE/NV/10322—23) Thread wear evaluation for 7" and 9-5/8" O.D. [outside diameter] casing conducted at the Nevada Test Site: Engineering report.** (Fenix and Scisson, Inc., Las Vegas, NV (USA)). [1987]. Contract AC08-84NV10322. 6p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009334.

This study, conducted during 1985, evaluated five types of premium casing coupling thread wear. The tests were monitored with instrumented torque-turn and pull test equipment. During each make and break cycle, the coupling was load tested for five minutes to 75% of pipe body yield. This procedure was repeated until distortion of the coupling was not in conformance with API RP 5B1 specifications.

33388 **(ORNL—6366) An eddy-current laboratory test system using commercial equipment.** Dodd, C.V.; Whitaker, L.M.; Deeds, W.E. (Oak Ridge National Lab., TN (USA)). Apr 1987. Contract AC05-84OR21400. 120p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE87009799.

The combination of a Hewlett Packard impendance analyzer and a laboratory computer has produced a versatile and effective eddy-current laboratory test instrument. This combination has allowed a wide range of eddy-current measurements to be quickly, accurately, and easily performed. Also, this combination has been programmed to make absolute resistivity measurements, multiple-frequency/multiple-property measurements, normalized impedance measurements, and Bode plots (magnitude and phase vs frequency). These measurements are performed for a variety of coil and conductor combinations, including reflection, through-transmission, and single-coil configurations. The intelligence of the computer, combined with the ease of operation and programming of the impedance analyzer over the IEEE-488 bus, can make quick work of jobs that formerly took much longer.

33389 **(SAND—87-0505C) Developments in measurement techniques for shock-loaded solids.** Chhabildas, L.C.; Graham, R.A. (Sandia National Labs., Albuquerque, NM (USA)). 1987. Contract AC04-76DP00789. 18p. (CONF-870637—3). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87007084.

From Summer meeting of the American Society of Mechanical Engineers; Cincinnati, OH, USA (14 Jun 1987).

Developments in measurement technique for study of wave profiles in shock-loaded solids over the past decade are reviewed and their influence examined. It is found that this period is characterized by considerable activity which has been concentrated on significant improvements to earlier developments. The most influential instrumental developments are noted and some perspective on the nature of the development of shock instrumentation is presented. An extensive reference list is included. 164 refs.

33390 **(SAND—87-0525C) Multi-point transient modal testing.** Lauffer, J.P.; Tucker, M.D.; Smallwood, D.O. (Sandia National Labs., Albuquerque, NM (USA)). 1987. Contract AC04-76DP00789. 8p. (CONF-870665—5). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87007085.

From Society for Experimental Mechanics spring meeting; Houston, TX, USA (14 Jun 1987).

Recent advances in modal testing have made possible the measurement of frequency response functions using multiple uncorrelated random signals. This paper extends these concepts to multiple input transient testing. To allow the use of deterministic inputs, the theory of multiple input testing is first expanded and the conditions for the existence of a solution are examined. It is then shown that the addition of random delays to the inputs will satisfy the

conditions for a solution. Finally, the technique is evaluated in two experiments.

33391 (UCID—20923) Microwave component susceptibility, FY86: Final report. McConaghy, C. (Lawrence Livermore National Lab., CA (USA)). Nov 1986. Contract W-7405-ENG-48. 27p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87003601.

The work in component susceptibility for FY86 was concentrated in three areas: radar front end components, dielectric coated laser mirrors, and computer code validation experiments. This is also the rough chronological order of the work throughout the fiscal year. In this report, each of the areas will be addressed in terms of objectives and results. The computer validation experiments are still ongoing and will continue through FY87.

33392 Ultrasonic surface and bulk wave interaction with fluid-saturated porous solids. Mayes, M.J.; Nagy, P.B.; Adler, L.; Bonner, B.P.; Streit, R. (Ohio State Univ., Columbus, OH). pp 51-57 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—). Contract W-7405-ENG-48.

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

There has recently been considerable interest in the acoustics of fluid-saturated porous media. The most interesting peculiarity, the existence of two compressional waves, was first predicted by Biot in 1956. It was not until 1980 that Plona experimentally observed the additional slow compressional bulk wave in a water-saturated porous solid composed of sintered glass spheres. Even more recently, Feng and Johnson have extended the Biot theory to numerically predict the velocities of a new surface mode as well as the expected pseudo Rayleigh and pseudo Stoneley modes at fluid-porous solid (i.e. fluid/fluid-saturated porous solid) interface. The expected modes are either below the fluid velocity, so that energy will not leak into the fluid at all, or just above it so that energy leaks at such a high angle, in which case simple phase-matching techniques are not applicable for excitation and detection. In a recent paper, the authors suggested the application of a slightly corrugated periodic surface, since, in this case every surface mode becomes somewhat leaky in certain directions at particular resonant frequencies. In this work they are presenting experimental results of surface wave velocity measurements, using this periodic surface technique. The surface wave velocities are compared to bulk results obtained by a new wedge technique.

33393 Acoustic wave scattering from a circular crack: comparison of different computational methods. Visscher, W.M. (Los Alamos National Lab., NM). pp 79-86 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—).

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

This work was motivated by a disagreement between the results obtained from two computations of scattering of an axially incident elastic p-wave on a circular crack. One calculation, using the method of A.K. Mal, involving the direct solution of the Helmholtz integral equation for this case, shows the total cross-section oscillating with a considerable amplitude as a function of the Rayleigh surface wavenumber. Another calculation, using MOOT, in which the elastic displacement near the crack is expanded in regular spherical eigenfunctions of the elastic wave equation, agrees with the first calculation reasonably well up to a wavenumber value of 10 or so, but thereafter the total cross-section oscillations rapidly disappear. The results arrived at by the authors indicate that their original speculation, that this discrepancy was caused by the inadequacy of the spherical basis set, was wrong. In its application to their test problem, they found the spherical basis set to work better than the cylindrical one. They are therefore led to conclude that the discrepancy is due to the fact that the truncation limit was not large enough in the original MOOT calculations.

33394 Three-D modeling of ultrasonic scattering from intergranular stress corrosion cracks. Achenbach, J.D.; Budreck, D.E. (Northwestern Univ., Evanston, IL). pp 87-92 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—).

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

This paper describes the derivation of a three-dimensional model for scattering of elastic waves by an intergranular stress corrosion crack (IGSCC). The model is based on a geometrical abstraction of the IGSCC. The crack has a main stem and left and right branches. The transducer is on the upper surface and the crack breaks the lower surface of a flat plate. The beam of transverse wave motions radiated by the transducer insonifies the crack under an angle of 45° with the lower face of the plate. The current profile of the beam is Gaussian, but the use of other beam profiles is possible. The position of the center of the transducer can be varied in the plane of symmetry of the crack. This allows the simulation of sizing techniques which require probe motion. The backscattered field has been computed by using the Kirchhoff approximation for the crack-opening displacements of the individual components of the branched crack. The backscattering by the main stem and the branches has been analyzed and superimposed to provide the total backscattered field in the frequency domain. Numerical results are presented.

33395 Eddy current response to three-dimensional flaws by the boundary element method. Beissner, R.E.; Hwang, J.H. (Southwest Research Institute, San Antonio, TX). pp 145-151 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—). Contract W-7405-ENG-82.

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

In this paper they describe a hybrid approach to the three-dimensional simulation of an eddy current inspection. Their approach makes use of the boundary element method (BEM) for solving the boundary integral form of Maxwell's equations for the current density and tangential magnetic field on the surface of a flaw in a known incident field. Incident field data, i.e., the current density and magnetic field in the material in the absence of a flaw, are provided by analytic solutions for simple part geometries, or by an additional boundary element calculation if the part geometry is complex. Probe response is then calculated by means of the reciprocity theorem, with receiver field data provided again by analytic or boundary element calculations for the unflawed part.

33396 Boundary integral equation method for field distribution under cracked metal surface. Kogan, V.G.; Bozzolo, G.; Nakagawa, N. (Ames Lab., IA). pp 153-160 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—). Contract W-7405-ENG-82.

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

Two approaches to the problem of the AC magnetic field distribution inside conducting media are currently used. One consists of solving the quasi-stationary Maxwell differential equations subject to certain boundary conditions. Another one is based upon certain boundary integral equations that involve only the field components at the boundary surface. Aside from some numerical advantage in treating unknowns of a lower dimension, the second method fits better the common formulation of the eddy current NDE, which aims at determination of the total impedance of a metal part (or its change due to a defect). The impedance is related to the integrated energy flux through the metal surface and as such it can be expressed in terms of the field components at the surface exclusively. They consider in this report only the two-dimensional (2-D) case. Having little to do with real situations, this case is nevertheless instructive. Analytical development can be carried in some 2-D situations almost to the end as opposed to the general 3-D configurations. Solvable 2-D problems may serve as test cases for more involved and less transparent general approaches.

33397 **Numerical calculations of acoustic emission.** Johnson, J.A. (Idaho National Engineering Lab., Idaho Falls). pp 301-309 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—). Contract AC07-76ID01570.

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

A computer program which solves the partial differential equations for sound propagation numerically is applied to the study of problems in acoustic emission. The program uses finite difference technique to calculate sound fields due to distributions of sources in complex geometries in two dimensions. The potential to handle more complex geometries and to model more realistic sources is the main advantage of this type of calculation over the analytic calculations. The main disadvantage of the numerical technique is the cost of obtaining results since a large main frame computer or supercomputer is required. In this paper the fields due to a simple source in a planar geometry are calculated and compared to the analytic results using the methods developed by Pao and his collaborators. The purpose of these calculations is to test the feasibility of the code for calculations of acoustic emissions and to determine the limitations by comparing it with the Green's function of generalized ray theory results. Further calculations in more complex geometries which cannot be handled by the Green's function method are planned, including the effect of sources near or at the tip of a crack and the effect of geometric distortions due to plastic strain in a sample in a tension test.

33398 **Semi-adaptive approach to in-flight monitoring using acoustic emission.** Scala, C.M. (Aeronautical Research Labs., Melbourne, Australia). pp 361-369 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—).

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

This paper briefly reviews existing procedures for distinguishing between AE sources in aircraft structures. Limitations in the applicability of frequency discrimination and source location techniques are addressed, and the failings of the fundamental and empirical approaches are shown. A semi-adaptive approach is proposed, which combines the results of research on AE sources, sensors and wave propagation (using calibration studies) to predict features of AE waveforms from crack growth in different locations in a structure. The semi-adaptive approach is applied to the processing and analysis of AE waveforms, detected during full-scale fatigue testing of a Mirage aircraft, to distinguish between spurious sources and AE from fatigue crack propagation in bolt holes in the aircraft's aluminium alloy wing-spar.

33399 **Use of a chirp waveform in pulsed eddy current crack detection.** Beissner, R.E.; Fisher, J.L. (Southwest Research Institute, San Antonio, TX). pp 467-472 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—). Contract W-7405-ENG-82.

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

Calculations of crack response to a chirp waveform indicate that crack depth can be estimated from the autocorrelation of the flaw signal. For crack depths of 0.13 mm or greater in low conductivity materials, a band-width of about 8 MHz should be adequate. Although only one chirp duration was considered in the calculations, this chirp length (20 μsec) appears to be adequate from the standpoint of depth resolution. The 20 μsec chirp is also long enough to significantly reduce the peak power that would be needed to achieve comparable depth resolution by the direct pulsed eddy current method. Finally, the 20 μsec chirp is short enough to allow several repetitive pulses for signal averaging purposes while operating in a scanning mode. The chirp/autocorrelation synthesis of a pulsed eddy current experiment, with chirp bandwidth of about 8 MHz and duration of about 20 μsec, therefore appears to be a practical approach to the estimation of crack depth.

33400 **Acoustic microscopy using amplitude and phase measurements.** Reinholdtsen, P.; Khuri-Yakub, B.T. (Stanford Univ., CA). pp 543-551 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—).

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

The authors have built a low-frequency scanning acoustic microscope (SAM) that measures both amplitude and phase. The majority of SAMs simply measure the amplitude of the reflected signal. Measuring the phase gives a great deal more information. For one thing, the phase is very sensitive to height variations. Measuring the phase also gives us the ability to do signal processing on the resulting images, such as removing the effects of surface features from defocused images of subsurface defects.

33401 **Characterization of flaw shape and orientation using ultrasonic angular scans.** Hsu, D.K.; Wormley, S.J.; Thompson, D.O. (Ames Lab., IA). pp 585-594 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—).

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

In this work an angular scan method is developed in which the flaw shape and orientation are estimated from azimuthal and polar scans of the flaw signal amplitude. Based on such preliminary determination of flaw shape and orientation, an aperture orientation may then be chosen so that the aperture axis is perpendicular to the flaw surface where the total curvature is a minimum. The angular scans and the judicial choice of the aperture configuration for data acquisition have several advantages: the signal-to-noise ratios of the flaw waveforms are improved, the flash point interference phenomena are avoided, and the symmetry planes determined in the angular scans allow two-dimensional cross-sectional reconstructions in the principal planes of the ellipsoid-like flaws.

33402 **Uniform field eddy current probe: experiments and inversion for realistic flaws.** Moulder, J.C.; Shull, P.J.; Capobianco, T.E. (National Bureau of Standards, Boulder, CO). pp 601-610 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—). Contract W-7405-ENG-82.

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

A UFEC probe was designed and fabricated at NBS and used to study a series of semi-elliptical EDM slots and fatigue cracks in Ti-6A ell-4V. Calibration of UFEC probe can be carried out with any of three calibration artifacts - cylindrical recess, spherical cap, or EDM slot. Empirical shape factors needed to calculate H/I were determined for cylindrical and spherical recesses. Measurements on all EDM slots and those fatigue cracks less than 1.5 mm long were in excellent agreement with the predictions of Auld's uniform field theory for $a/\delta > 1.6$. For larger fatigue cracks, measurements underestimated flaw depth by up to 42%. Crack closure forces acting on the longer cracks is one possible explanation that is consistent with experimental observations. A simple method for inverting UFEC measurements to obtain flaw depth when the length is known was demonstrated. Predicted depths were within +/- 0.1 mm in the absence of possible closure effects.

33403 **Development and comparison of beam models for two-media ultrasonic inspection.** Newberry, B.P.; Thompson, R.B.; Lopes, E.F. (Ames Lab., IA). pp 639-647 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—).

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

This paper reports on an effort to model the radiation pattern of a submerged ultrasonic transducer exciting a beam which is incident on a liquid-solid interface. The important aspects of this process are the diffraction of the beam as it propagates in the liquid

and solid media, focussing of the beam due to a lens at the transducer face and/or the curvature of the interface, and aberrations induced by refraction at the interface. Presented here are two models which treat both diffraction and aberration effects as an ultrasonic beam passes through a planar or cylindrical interface. The approximate Gauss-Hermite model is presented as a working computational tool. The accuracy of its predictions are evaluated by comparison to those of the more exact and computationally intensive Green's function model.

33404 **Technique for generation of unipolar ultrasonic pulses.** Thompson, D.O.; Hsu, D.K. (Ames Lab., IA). pp 667-676 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—). Contract W-7405-ENG-82.

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

The purpose of this paper is to report results that describe a new way to generate broadband, unipolar pulses in pulse-echo operation using conventional planar transducers. A review of requirements is first given; this summary is then followed by a description of a transmit/receive switch that has been developed for pulse-echo operation and some results that have been obtained with it. These results are then discussed and compared with results obtained with conventional instrumentation.

33405 **Acoustic transducers and lens design for acoustic microscopy.** Chou, C.H.; Khuri-Yakub, B.T. (Stanford Univ., CA). pp 677-685 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—). Contract FG03-84ER45157.

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

The direct measurement of surface wave velocity by using conventional transducer-lens systems gives poor spatial resolution because it suffers from the interference of the specularly-reflected signal with the surface wave component caused by the low efficiency of surface wave excitation. In order to increase the surface wave excitation efficiency, they first modified the design of the standard longitudinal transducer-lens system. Furthermore, they worked out a novel configuration, i.e., the shear transducer-lens system. This gives very high surface wave excitation efficiency and anisotropic acoustic beam distribution. Therefore, it can be used for direct measurements of materials properties in different directions with much less defocus than in the case of conventional transducer-lens systems. This gives the potential of many new applications of materials characterization with excellent spatial resolution.

33406 **Design and characterization of uniform field eddy current probes.** Shull, P.J.; Capobianco, T.E.; Moulder, J.C. (National Bureau of Standards, Boulder, CO). pp 695-703 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—). Contract W-7405-ENG-82.

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

The authors discuss the constraints and trade-offs involved in designing a uniform field eddy current probe intended for quantitative flaw inversion. Two probes were fabricated to cover the frequency ranges of 0.5-4 MHz and 2-8 MHz. They found that shaping the pole tips of the ferrite probe improved the size and uniformity of the field's spatial distribution, as shown by the results of field mapping. They achieved a uniformity within 10% over an area of 2.4 x 2.2 mm. The probe was found to be relatively insensitive to the amount of tilt or liftoff as long as it remained constant during the measurement. On the other hand, the probe was extremely sensitive to changes in either tilt or liftoff during the measurements. A signal of 4 Omega resulted from only 1 μm of vertical motion. This means that extremely precise control of probe positioning is necessary. The probes were used successfully for quantitative measurements on surface-connected flaws in A ell and Ti alloys. The size of the uniform field enabled us to measure flaws as long as 3 mm. The smallest flaws that could be accurately measured were 1 mm long and 0.4 mm deep. Smaller flaws would require a higher frequency of operation to achieve $a/\delta > 1.6$, a limit that was determined empirically in this study.

33407 **Assessment of eddy current probe interactions with defect geometry and operating parameter variations.** Rummel, W.D.; Christner, B.K.; Long, D.L. (Denver Aerospace, CO). pp 705-712 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—). Contract W-7405-ENG-82.

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

The authors describe a method for assessing and experimentally validating the behavior of eddy current probes when applied to testing for defects in aerospace materials. Haynes 188, titanium, and aluminium test specimens containing laboratory grown fatigue cracks and electrical discharge machined (EDM) notches were used to assess the performance and response of a Nortec SP02065 500 KHz to 2 MHz shielded differential surface probe and a Nortec NDT-25L eddy current instrument in scanning fatigue cracks and EDM notches in the specimens while varying operating frequency, defect size, and probe orientation. Defect width was found to contribute significantly to eddy current response from a defect at high frequency. The response obtained from all defect types and sizes was found to decrease as the operating frequency was decreased. Flaw response and detectability when the flaw was smaller than the probe diameter were found to be functions of the probe orientation.

33408 **Image segmentation algorithm for nonfilm radiography.** Bell, Z.W. (Martin Marietta Energy Systems, Inc., Oak Ridge, TN). pp 773-779 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—). Contract AC05-84OR21400.

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

Radiographs for automatic interpretation are acquired by an X-ray sensitive scintillating lightpipe that illuminates a charge-coupled device (CCD) camera. The CCD camera is interfaced to an image processor and the pixels in the camera are digitized at video rates. The image is available for storage and/or processing in the image processor as it is acquired. There are two distinct phases in the automated inspection of such radiographs. These can be loosely described as image segmentation and pattern classification. The segmentation phase is concerned with dividing the radiograph into regions of interest and regions of boredom. The regions of interest consist of those areas in the image that contain the shadows of mass excess or mass defect, while the regions of boredom are marked by the signature of noise on an otherwise uneventful average mass density. The classification problem is one of characterizing discovered defects (the term defect will be used to denote any deviation from the average mass density) as to their shape, size, radiographic density, or the like. This paper will be limited to a discussion of an algorithmic approach to the implementation of the segmentation phase.

33409 **Priori knowledge based wiener filtering approach to ultrasonic scattering amplitude estimation.** Neal, S.; Thompson, D.O. (Ames Lab., IA). pp 807-813 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—). Contract W-7405-ENG-82.

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

The Wiener filter is currently used in the ultrasonic scattering amplitude estimation problem as a means of desensitization during deconvolution. The work summarized here focuses on a Wiener filtering approach which incorporates a priori flaw and noise information. It is shown that this approach leads to improved scattering amplitude estimates and improved radius estimates.

33410 **Multiparameter methods with pulsed eddy currents.** Dodd, C.V.; Deeds, W.E. (Oak Ridge National Lab., TN). pp 849-854 of Review of progress in quantitative nondestructive evaluation. Volume 6A. Thompson, D.O.; Chimenti, D.E. (eds). New York, NY; Plenum Press (1987). (CONF-8608142—). Contract AC05-84OR21400.

From Review of progress in quantitative NDE; La Jolla, CA, USA (3 Aug 1986).

Multiparameter methods have been used for a number of years to distinguish certain material properties from others that may be varying in the same eddy-current inspection. Usually the measured data are the magnitudes and phases of the eddy currents at several fixed frequencies. Alternatively, the necessary data can be obtained from pulsed eddy currents by measuring the pulse heights at various times or the times to reach various pulse heights. Such data can be used to analyze the pulse into various Fourier components, but that is time consuming and unnecessary. The raw data (for example, the pulse heights at various times) can be used as variables in polynomial approximations to the various properties in exactly the same way as has been used with the multifrequency, multiparameter method. This approach has several advantages, including simpler equipment, ability to use higher frequencies, and less modification required for different inspection problems.

33411 **Profilometer for tubes.** Livingston, R.A. (to Dept. of Energy). US Patent Application 6-899,122. 22 Aug 1986. 17p. Contract AC07-76ID01570. DE87007211 NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87007211.

An apparatus for inspecting interior surfaces of tubes or pipes. A spring-loaded sensor pin, slidably mounted in a rotatable housing is displaced in the housing as the housing is rotated. A centering means maintains spacing of the housing with respect to the tube wall. Displacement of the sensor pin in the housing are converted to measurable electrical signals by a linearly variable differential transformer.

33412 **Analytic signal converter for ultrasonic nondestructive testing.** Duncan, M.G.; Marietta, M. (Oak Ridge Y-12 Plant, Martin Marietta Energy Systems, Inc., Oak Ridge, TN 37831). pp 270-276 of Proceedings of the IEEE Southeastcon 86 conference. Piscataway, NJ; IEEE Service Center (1986). (CONF-8603139—). Contract AC05-84OR21400.

From Southeastcon '86: IEEE region 3 conference and exhibit; Richmond, VA, USA (23 Mar 1986).

An analytical signal converter was developed to improve flaw detection in parts. The converter can resolve echoes 700 ns apart. The converter operates in real-time by using a single-sideband conversion technique, Weaver's Method. The transducer range is 1 to 40 MHz.

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REFER ALSO TO CITATION(S) 32695, 32696, 33192, 33218, 33391, 33623, 33628

33413 **(CONF-870516—6) Gas engineering for pulsed power and switching.** Hunter, S.R. (Oak Ridge National Lab., TN (USA)). May 1987. Contract AC05-84OR21400. 10p. NTIS, PC A02. File Number DE87008825.

From 5. international symposium on gaseous dielectrics; Knoxville, TN, USA (3 May 1987).

Studies of externally sustained diffuse gas discharge switches have demonstrated that diffuse discharges possess the potential for fast, repetitive, high power switching in inductive energy storage pulsed power applications. Several analyses have determined the operating requirements on the diffuse discharge in these applications and have shown the importance of gas engineering by tailoring the properties of the gas mixture within the switch to achieve the desired operating conditions. More recently, attention has been turned to ways of improving the current switching efficiency of these discharges (i.e., lower discharge impedance operation) and to the development of techniques to actively control the switch opening and closing by optically modifying the electron attachment and detachment processes in the discharge gas mixture. These and other possible research areas in gas engineering studies for pulsed power switches are discussed. 32 refs.

33414 **(LA-UR—87-1452) Photoconductor pulse generators and sampling gates for characterization of high-speed devices and transmission lines.** Paulter, N.G.; Hammond, R.B. (Los Alamos National Lab., NM (USA)). 1987. Contract W-7405-ENG-36. 12p. (CONF-870385—9). NTIS, PC A02. File Number DE87009012.

From SPIE conference on growth of compound semiconductors; Bay Point, FL, USA (22 Mar 1987).

We describe photoconductive semiconductor devices developed for application in diagnostics of high-speed electronic devices and circuits. Both pulse generation and sampling functions are provided by these ultrafast photoconductors. The photoresponse of different semiconductor materials (GaAs, InP, Si) that have been ion bombarded (Ar, H, He, Ne, O, Si) was investigated and characterized. Response times as short as 1 picosecond have been observed. High frequency propagation characteristics of microstrip and coplanar waveguide transmission lines have been studied and modelled. Application of this measurement technique to the characterization of a microwave GaAs transistor is presented.

33415 **(LBL—22832) Quad fourfold (4 X 4) logic unit (LBL No. 21X6421 P-1).** Mcdonald R.J.; Landis, D.A.; Maier, R.M.; Rude, B.S.; Wozniak, G.J. (Lawrence Berkeley Lab., CA (USA)). Jan 1987. Contract AC03-76SF00098. 13p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009277.

A quad fourfold (4 x 4) logic unit has been designed and packaged in a single-width NIM module for use in nuclear and atomic physics experiments. The four inputs of each unit are combined internally to perform logical AND, OR, and VETO functions. A set of eight DIP switches on the front panel select either the input signal or its complement, trigger slope, output pulse duration, and positive or negative logic on the overlap signal. A one-shot multivibrator may be triggered on either the positive or negative-going slope of the overlap signal to form the shaped output. The output width can be adjusted between ~50 ns and 50 μsec with two coarse ranges and a twenty-turn potentiometer. An LED attached to the one-shot gives a visual indication of the output rate. 4 figs.

33416 **(SAND—86-2719C) The effects of high temperature and total dose gamma radiation on a power MOSFET [metal-oxide semiconductor field effect transistor] (N-channel) and an operational amplifier.** Wheelis, W.T.; Luker, S.M. (Sandia National Labs., Albuquerque, NM (USA)). 1987. Contract AC04-76DP00789. 8p. (CONF-870575—1). NTIS, PC A02. File Number DE87006710.

From 39. National Aerospace and Electronics (NAECON) conference; Dayton, OH, USA (18 May 1987).

Little data exists on the effects of high temperature (> 125°C) and/or total accumulated gamma doses exceeding 10 Megarad on electronic components. The results of a series of tests investigating these effects on an N-channel MOSFET and a dielectrically isolated operational amplifier are presented. The devices were exposed to high temperatures and high total dose radiation and a simultaneous combination of these environments. For the MOSFET, temperature effects appear to be more detrimental than long-term radiation exposure, and that "radiation burn in" may be a viable way to provide uniform device response in a radiation environment. The operational amplifier had a flat temperature response from ambient to 125°C, and minimal device parameter shifts with an accumulated dose of 100 Megarads (air).

33417 **(SAND—86-2785C) The input impedance of probe fed rectangular cavity which feeds into a plasma covered cylindrical body.** Jarem, J.M. (Texas Univ., El Paso (USA). Dept. of Electrical Engineering). 1986. Contract AC04-76DP00789. 10p. (CONF-870655—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87003032.

From Antennas and Propagation Society symposium; Blacksburg, VA, USA (15 Jun 1987).

An important problem in the area of antenna theory is the problem of determining the input impedance and antenna characteristics of a probe-fed cavity-aperture antenna which is flush mounted on a conical or cylindrical body and covered by an inhomogeneous plasma sheath. This paper presents an analysis and solution to the

above problem when a cylindrical body covers the plasma aperture. The formulation of the equations which describes the electromagnetic fields is based on use of Green's functions and application of the appropriate boundary conditions. Once the electric field is determined, the input impedance of the antenna system is found. Example calculations are made, and the impedance for different frequencies are compiled in the report.

33418 **(SAND—87-0890) Sandia programs relevant to microelectronics fabrication.** Picraux, S.T.; Vook, F.L.; Gregory, B.L. (Sandia National Labs., Albuquerque, NM (USA)). Apr 1987. Contract AC04-76DP00789. 17p. NTIS, PC A02/MF A01; GPO Dep. File Number DE87010538.

This report was prepared for the Semiconductor Industry and the National Laboratories Workshop held at the National Academy of Sciences, Washington, DC, February 24, 1987. It details the current Sandia program activities relevant to microelectronics fabrication.

33419 **(UCRL—92372) Transient high frequency signal estimation: A model-based processing approach.** Barnes, F.L. (Lawrence Livermore National Lab., CA (USA)). 22 Mar 1985. Contract W-7405-ENG-48. 18p. (CONF-851209—8). NTIS, PC A02. File Number DE87008756.

From 24. IEEE conference on decision and control; Ft. Lauderdale, FL, USA (11 Dec 1985).

By utilizing the superposition property of linear systems a method of estimating the incident signal from reflective nondispersive data is developed. One of the basic merits of this approach is that, the reflections were removed by direct application of a Weiner type estimation algorithm, after the appropriate input was synthesized. The structure of the nondispersive signal model is well documented, and thus its' credence is established. The model is stated and more effort is devoted to practical methods of estimating the model parameters. Though a general approach was developed for obtaining the reflection weights, a simpler approach was employed here, since a fairly good reflection model is available. The technique essentially consists of calculating ratios of the autocorrelation function at lag zero and that lag where the incident and first reflection coincide. We initially performed our processing procedure on a measurement of a single signal. Multiple application of the processing procedure was required when we applied the reflection removal technique on a measurement containing information from the interaction of two physical phenomena. All processing was performed using SIG, an interactive signal processing package. One of the many consequences of using SIG was that repetitive operations were, for the most part, automated. A custom menu was designed to perform the deconvolution process.

33420 **(UCRL—92822) Fundamental gain-bandwidth-volume limitations of antennas.** Bevensee, R.M. (Lawrence Livermore National Lab., CA (USA)). Jun 1985. Contract W-7405-ENG-48. 6p. (CONF-850839—2). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87008156.

From International symposium on antennas and propagation; Kyoto, Japan (20 Aug 1985).

The analysis of gain-bandwidth relations for general antennas has been founded on the properties of a spherical mode expansion of the fields external to the antenna volume. The mode amplitudes have not been directly related to a charge-current distribution within the antenna volume, raising questions of physical realizability. An expression is derived in this report for the fractional bandwidth of an antenna in terms of a rigorously defined time-average reactive stored energy at the center frequency. This energy is computed directly from any reasonable charge-current distribution within the antenna volume. The method described here allows analysis of differing antenna geometrics and desired gains. (JDH)

33421 **(UCRL—94114) Improving ignitron voltage holdoff by heating the wall.** Cummings, D.B. (Lawrence Livermore National Lab., CA (USA)). 17 Jun 1986. Contract W-7405-ENG-48. 5p. (CONF-860674—12). NTIS, PC A03. File Number DE87009600.

From 17. power modulator symposium; Seattle, WA, USA (23 Jun 1986).

A production run of 2-inch molybdenum-anode ignitrons frequently failed to hold voltage after a day or two in protective crowbar service designed to be well within their published ratings. The application of heat to the wall opposite the anode solved the problem in limited tests. This experience was an extreme case of the voltage degradation commonly seen in ignitrons which appears to result from mercury condensation under conditions which would not seen to favor it. The nature of this anomalous mercury condenstion is unknown but the severity of voltage degradation seems to depend on the amount of residual gas contamination. This is inferred from the unusually high percentage of slightly gassy tubes, although no gassy tubes were used. Heating the wall is recommended to permit the use of tubes within their current and charge transfer limits which might otherwise fail to hold voltage.

33422 **(UCRL—94212) Characteristics and modeling of high voltage photoconductive switching devices.** Morse, J.D.; Pocha, M.D. (Lawrence Livermore National Lab., CA (USA)). 19 Jun 1986. Contract W-7405-ENG-48. 6p. (CONF-860674—13). NTIS, PC A02. File Number DE87009617.

From 17. power modulator symposium; Seattle, WA, USA (23 Jun 1986).

Photoconductive devices have recently experienced increased popularity for a variety of applications including high voltage power modulation, pulse shaping, optical and radiation detection and high speed pulsing and sampling. Knowledge of optical excitation requirements in order to obtain a desired output response is of crucial importance in many of the above applications. An accurate analytical model of the on-state behavior of these devices has been developed which takes into account all the known second order effects on mobility and carrier generation at room temperature (electric field, carrier-carrier interaction and optical reflection and attenuation with depth). This model has been experimentally verified over a wide range of incident optical excitation.

33423 **(UCRL—95087) A treatment which inhibits surface flashover in vacuum.** Hatfield, L.L.; Leiker, G.R.; Kristiansen, M.; Colmenares, C.; Hofer, W.W.; DiCapua, M.S. (Texas Tech Univ., Lubbock (USA); Lawrence Livermore National Lab., CA (USA)). 22 Sep 1986. Contract W-7405-ENG-48. 8p. (CONF-860922—1). NTIS, PC A02. File Number DE87009564.

From 12. international symposium on discharges and electrical insulation in vacuum; Shoresh, Israel (22 Sep 1986).

A treatment is described which doubles the pulsed surface flashover potential of some insulator materials in vacuum. The test samples are short solid cylinders 1 cm in length and 6.35 cm in diameter. The flashover potential is measured by placing the sample between brass electrodes in a vacuum chamber at a pressure of 1 micro-Torr and applying a high voltage double exponential pulse with 1.5/135 μs time constants. The treatment consists of exposing a sample to 80,000 sparks from a spark plug in vacuum. For each material, an untreated and a treated sample are measured under identical conditions, and the results compared. Results on Lexan show an increase in flashover potential from 100 kV/cm to 170 kV/cm (limit of our Marx generator). On the machinable ceramic Macor, the results were 60 kV/cm untreated and 140 kV/cm treated. Surface analysis using Electron Spectroscopy for Chemical Analysis shows that the treatment alters the surface composition of the material. Also, the secondary electron emission coefficient has been measured for treated and untreated samples over a range of incident electron energies. The SEE changes dramatically after treatment. These measurements and the predictions of the existing theoretical model will be discussed.

33424 **(UCRL—95872) A finite difference approach to microstrip antenna design.** Barth, M.J.; Bevensee, R.M.; Pennock, S.T. (Lawrence Livermore National Lab., CA (USA)). Dec 1986. Contract W-7405-ENG-48. 5p. (CONF-870655—4). NTIS MF A01; 2; GPO Dep. File Number DE87007324.

From Antennas and Propagation Society symposium; Blacksburg, VA, USA (15 Jun 1987).

Microstrip antennas have received increased attention in recent years, due to their size and cost advantages. Analysis of the microstrip structure has proved difficult due to the presence of the dielectric substrate, particularly for complex geometries. One possi-

ble approach to a solution is the use of a finite difference computer code to model a proposed microstrip antenna design. The models are easily constructed and altered, and code versions are available which allow input impedance or far-field patterns to be calculated. Results for some simple antenna geometries will be presented.

33425 **(UCRL—96006) Observation of HSiCl by laser-induced microfluorescence during the direct laser writing of silicon microstructures.** Magnotta, F. (Lawrence Livermore National Lab., CA (USA)). 27 Jan 1987. Contract W-7405-ENG-48. 9p. (CONF-870725—4). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87005816.

From 22. annual meeting of the Microbeam Analysis Society; Kailua-Kona, HI, USA (13 Jul 1987).

The observation of HSiCl in localized direct-laser writing of polycrystalline silicon microstructures is a strong indication that gas phase kinetics are involved in the deposition process, in addition to surface kinetics. The highly localized observation region intrinsic to this technique further suggests that this species is produced directly and not a result of subsequent secondary reactions. Energetic considerations suggest the presence of $SiCl_3$; however, detection of this species was not attempted. Modification of the apparatus to incorporate a tunable laser would allow a systematic search for other reactive intermediates. Furthermore, the technique of laser-induced microreaction/detection should find widespread use as a powerful spectroscopic probe for studying both photolytic and pyrolytic gas-surface reactions.

33426 **(UCRL—96274) An antenna engineering handbook for Army and Marine field communication applications.** Breakall, J.K.; Domning, E.E.; Christman, A.M.; Averill, W.P.; McDonald, J. (Lawrence Livermore National Lab., CA (USA); Naval Academy, Annapolis, MD; Army Strategic Communications Command, Fort Huachuca, AZ (USA)). Feb 1987. Contract W-7405-ENG-48. 6p. (CONF-870655—3). NTIS, PC A02. File Number DE87007055.

From Antennas and Propagation Society symposium; Blacksburg, VA, USA (15 Jun 1987).

There is currently interest in modeling various antennas chosen to be used in field communication scenarios in the HF range by both the Army and Marine Corps. An engineering antenna handbook and computer database program has been produced at LLNL which will be used in producing an ultimate field antenna handbook. A host of antenna types and configurations have been studied for characteristics which can be used for optimizing best performance when interfaced with existing propagation codes and models. A parameter variation study has been undertaken with frequencies varied from 2 to 30 MHz and ground conductivities and dielectric constants varied for all possible ground conditions. Antenna parameters such as length, height, number of wires, ground stake length, and screen radius variation about some nominal have been looked at. Figures of merit have been devised for both surface and sky wave propagation. Various ways of presenting final results have been explored such as tables, graphs, databases, and parametric lookup tables.

33427 **(UCRL—96440) Test of a coaxial-line source model for NEC [Numerical Electromagnetics Code].** Burke, G.J. (Lawrence Livermore National Lab., CA (USA)). Mar 1987. Contract W-7405-ENG-48. 10p. (CONF-8703109—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87008488.

From 3. annual review of progress in applied computational electromagnetics; Monterey, CA, USA (24 Mar 1987).

A coaxial-line source model for wire antennas, employing a magnetic frill current, has been demonstrated in a method-of-moments solution similar to that in the computer code NEC. The solution makes use of polynomial current expansion and point matching of the field, while NEC has a spline current expansion of sin(ks), cos(ks), and constant terms with point matching. Excellent agreement between computed and measured input admittances was obtained. The coaxial-line model has been tested in NEC and results for this and the other NEC source models are compared in this paper.

33428 **Chemical and structural investigation of Schottky and ohmic Au/GaAs contacts.** Coulman, D.; Newman, N.; Reid, G.A.; Liliental-Weber, Z.; Weber, E.R.; Spicer, W.E. (Hewlett—Packard Laboratories, Palo Alto, California 94304). *Journal of Vacuum Science and Technology, A: Vacuum, Surfaces, and Films;* **5**: No. 4, 1521-1525(Jul 1987).

Recently we have shown that the gold contacts deposited on ultrahigh vacuum cleaved (110) n-GaAs exhibit strongly rectifying Schottky barrier-type behavior which becomes "ohmic" upon annealing due to a nonrectifying low-resistance current pathway at the periphery of the contact. These Au/n-GaAs contacts are of particular interest because of this rectifying to ohmic transition. Using scanning Auger electron spectroscopy (AES), scanning electron microscopy (SEM), and transmission electron microscopy (TEM) techniques combined with electrical device measurements, we are able to correlate the change in ohmic behavior for diodes annealed in a nitrogen environment above 360°C with the formation of very thin, long, predominantly Au crystallites on the surface of the GaAs at the periphery of the contact. These crystallites are typically 5—10 μ long, 500—2000 A wide, and are crystallographically oriented along the GaAs <110> direction. TEM and AES sputter profiles have shown that these structures are —100—150 A thick. Glancing incidence sputtering using 1-keV Ar ions with sample rotation, as well as a wet chemical mesa etch (H_2SO_4:H_2O_2:H_2O), were used to selectively remove the crystallites from around the periphery. AES, SEM, and TEM confirm the removal of the crystallites. After this removal, the rectifying behavior of the diode was restored. This demonstrates that the presence of the thin Au crystallites can be correlated with the ohmic behavior in this system.

33429 **Ultrahigh vacuum studies of Pd metal/insulator/semiconductor diode H_2 sensors.** Rye, R.R.; Ricco, A.J. (Sandia National Laboratories, Albuquerque, New Mexico 87185-5800). *Journal of Vacuum Science and Technology, A: Vacuum, Surfaces, and Films;* **5**: No. 4, 2755-2759(Jul 1987). Contract AC02-80ER10746.

Hydrogen sensitive Pd metal/insulator/semiconductor diodes provide an ambient temperature, low-power electronic sensor for hydrogen as a result of hydrogen trapping at the Pd/insulator interface. We have obtained both steady-state and kinetic results for diodes with clean Pd surfaces over hydrogen pressures ranging from 10^{-10} to 10^{-1} Torr. The sensitivity limit (equivalent to $<10^{11}$ total H_2 impacts/cm^2 at the Pd surface) is at least 7 orders of magnitude greater than that obtained for devices with contaminated surfaces, revealing that the kinetic and sensitivity limitations normally reported for such devices are a result of surface contamination. Analysis of the steady-state results is consistent with two binding states (9 and 6.8 kcal/mol of H relative to H_2/sub (g)/) for H at the Pd/SiO_2 interface. The kinetics of the diode response to H_2 are consistent with a "precursor" mechanism in which the initial step is adsorption into a weakly bound precursor state from which branching steps populate both strongly bound chemisorbed surface states and bulk states.

33430 **Digital time delay.** Martin, A.D. (to Dept. of Energy). US Patent Application 6-861,380. 9 May 1986. 26p. Contract W-7405-ENG-36. DE87007245 NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87007245.

Method and apparatus are provided for generating an output pulse following a trigger pulse at a time delay interval preset with a resolution which is high relative to a low resolution available from supplied clock pulses. A first lumped constant delay provides a first output signal at predetermined interpolation intervals corresponding to the desired high resolution time interval. Latching circuits latch the high resolution data to form a first synchronizing data set. A selected time interval has been preset to internal counters and corrected for circuit propagation delay times having the same order of magnitude as the desired high resolution. Internal system clock pulses count down the counters to generate an internal pulse delayed by an internal which is functionally related to the preset time interval. A second LCD corrects the internal signal with the high resolution time delay. A second internal pulse is then applied to a third LCD to generate a second set of synchronizing data which is complementary with the first set of synchronizing data for presen-

tation to logic circuits. The logic circuits further delay the internal output signal with the internal pulses. The final delayed output signal thereafter enables the output pulse generator to produce the desired output pulse at the preset time delay interval following input of the trigger pulse.

33431 **Overview of advances in light sources.** Hollister, D.D. (Lighting Systems Research, Lawrence Berkeley Lab., Univ. of California, Berkeley, CA 94720). pp 170-177 of Materials and optics for solar energy conversion and advanced lighting technology. Lampert, C.M.; Holly, S. Bellingham, WA; SPIE Society of Photo-Optical Instrumentation Engineers (1986). (CONF-860880—). Contract AC03-76SF00098.

From 30. SPIE technical symposium on optics and optoelectronic engineering; San Diego, CA, USA (17 Aug 1986).

Current efforts at the Lawrence Berkeley Laboratory to improve the operational efficiency of fluorescent lamps are based upon novel techniques intended to reduce internal resonance radiative transport losses. Such losses have been associated with "entrapment" of resonance radiation in the optically thick positive column of the mercury vapor discharge. Two promising techniques for entrapment reduction are provided respectively to selective mercury isotope enrichment and by the broadening of the hyperfine structure (hfs) of the resonance line λ2537 via the Zeeman effect. These techniques have, thus far, led to fluorescent lamp UV production efficiency enhancements, respectively of about 6.8% and 7%. Additional efforts to improve HID sources are in progress. Interesting metallic halides have been combined with electrodeless arc technology to produce a laboratory discharge system operating with an efficiency exceeding 170 lumens per watt, and a color rendering index (CRI) of 52.

33432 **Optical switching in "complementary" electrochromic windows.** Cogan, S.F.; Plante, T.D.; Mc Fadden, R.S.; Rauh, R.D. (EIC Labs., Inc., 111 Downey Street, Norwood, MA 02062). pp 32-38 of Materials and optics for solar energy conversion and advanced lighting technology. Lampert, C.M.; Holly, S. Bellingham, WA; SPIE Society of Photo-Optical Instrumentation Engineers (1986). (CONF-860880—).

From 30. SPIE technical symposium on optics and optoelectronic engineering; San Diego, CA, USA (17 Aug 1986).

The electrochemical and optical switching characteristics of a variety of variable transmittance complementary electrochromic windows are presented. The complementary configurations are based on hydrogen insertion in cathodically coloring amorphous WO/sub 3/ and crystalline K/sub x/WO/sub 3+(x/2)/ combined with anodically coloring IrO/sub 2/. These windows exhibit typical transmittance modulations from 70 to 15% in the visible spectrum and undergo ca. 4000 to 6000 switching cycles without degradation. The optical switching characteristics are discussed in terms of the complementary device structure and the electrochemistry of the individual electrochromic layers.

33433 **Some perspectives on electrochromic device research.** Deb, S.K. (Solar Energy Research Institute, Golden, CO 80401). pp 19-31 of Materials and optics for solar energy conversion and advanced lighting technology. Lampert, C.M.; Holly, S. Bellingham, WA; SPIE Society of Photo-Optical Instrumentation Engineers (1986). (CONF-860880—).

From 30. SPIE technical symposium on optics and optoelectronic engineering; San Diego, CA, USA (17 Aug 1986).

The term "electrochromism" can be applied to a broad range of phenomena in which any kind of color change is brought about by an electric field or a current in a solid or semi-solid system. A great deal of interest in this type of phenomenon arose primarily as a result of an observation that large densities of color-centers can be generated in a controlled and reversible manner in thin films of certain transition metal oxides, such as WO/sub 3/, MoO/sub 3/, etc., which are ordinarily large band gap insulators. In this paper the authors present some historical perspectives on this effect and assess, to a limited extent, the current status of this technology.

33434 **Partial discharge formation and breakdown in deionized water under repetitive stressing.** Rohwein, G.J. (Sandia National Labs., Albuquerque, NM 87185). pp 339-344 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—). Contract AC04-76DP00789.

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

Partial discharges (PD) often precede breakdown in repetitively pulsed megavolt capacitors. This mode of breakdown is believed to result from ionization buildup in the electrode gap from which streamers originate. A series of partial discharge tests using a point-plane gap have demonstrated that streamers periodically grow out of ionized bushes which tends to support this model. The tests have also shown water to have well defined corona inception and quench thresholds as well as a low first-shot inception level. Data from these tests and related small area breakdown experiments are presented. The random breakdown and recovery characteristics of water are also discussed.

33435 **Exploding metallic foils for slapper, fuse, and hot plasma applications: Computational predictions, experimental observations.** Lindemuth, I.R.; Browell, J.H.; Greene, A.E.; Nickel, G.H.; Oliphant, T.A.; Weiss, D.L.; Hemsing, W.F.; Garcia, I.A. (Thermonuclear Applications Group, Applied Theoretical Physics Div., Los Alamos National Lab., Los Alamos, NM 87545). pp 299-305 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—).

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

A new computer model for determining the time-dependent behaviour of exploding metallic foils is discussed. The model emphasizes the hydrodynamic expansion of exploding foils and gives insight into the temporal evolution of the material density and temperature as well as the nonlinear electrical circuit interaction. The model reproduces experimental observations very satisfactorily. Predictions of the model are also discussed. An experimental facility to verify or modify the predictions and to generate an atomic data base is described.

33436 **Foil fuses as opening switches for slow discharge circuits.** Parker, J.V.; Parsons, W.M. (Los Alamos National Lab., Los Alamos, NM 87545). pp 283-286 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—).

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

Metal foil fuses embedded in various materials are widely used as opening switches in fast discharge circuits (— 1 μs). Several technologies of current interest require opening switches in circuits which operate on a much longer time scale (— 100 μs). The authors have investigated the behavior of aluminium and copper foil fuses for conduction times of 100-200 μs. Reliable current interruption is obtained at the end of melting rather than at the end of vaporization. The ratio of initial to final resistance is > 100. In general, the performance of slow fuses can be predicted by simple scaling from fast fuse behavior. For applications where the switching function depends critically on the resistivity versus input energy characteristic, the results presented can be used in the selection of proper fuse size and geometry.

33437 **Photoconductive semiconductor switching for pulsed power applications.** Zutavern, F.; O'Malley, M.; Buttram, M.; Stygar, W. (Sandia National Labs., Albuquerque, NM 87185). pp 246-249 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—). Contract AC04-76DP00789.

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

Photoconductive semiconductor switching (PCSS) is used routinely in low voltage and current environments to investigate

"picosecond" phenomena. The potential of using PCSS in high power applications to obtain sub-nanosecond jitter and rise times, sub-millisecond recovery times, and solid state reliability has been discussed at previous pulsed power related conferences. This paper reports the results of efforts to develop PCSS specifically for pulsed power applications. Three of the most significant factors which limit the development of a high power PCSS are surface breakdown strength, fabrication techniques, and switching efficiency. Using two pulsed power and laser activation systems, the authors are measuring the effects of coatings, contacts, doping, ion implantation, and geometry (planar and three dimensional) on the surface breakdown strength and photoconductive properties of single crystal silicon.

33438 **Scaling relations for explosive switching in high power systems.** Turman, B.N.; Tucker, T.J. (Sandia National Labs., Albuquerque, NM). pp 208-211 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—). Contract AC04-76DP00789.

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

Analytical expressions are derived to study output power and energy efficiency for a conceptual system composed of a helical explosive generator, a Pavlovskii explosive opening switch, and a resistive load. These expressions are developed from empirical scaling relations for the generator and explosive switch.

33439 **Multi-megampere current interruption from explosive deformation of conductors.** Goforth, J.H.; Williams, A.H.; Marsh, S.P. (Los Alamos National Lab., Los Alamos, NM 87545). pp 200-203 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—).

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

Two approaches for using explosives to interrupt current flowing in solid conductors are described. One concept uses explosives to extrude the switch conductor into thin regions that fuse due to current in the switch. A preliminary scaling law is presented. The second approach employs dielectric jets to sever current carrying conductors. A feasibility experiment and an improved design are described.

33440 **Explosive generators for low-cost pulsed power.** Cnare, E.; Cowan, M. (Sandia National Labs., Albuquerque, NM 87185). pp 194-199 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—).

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

A practical application of explosive generators (MCGs) is to provide relatively low-cost pulsed power at very high energy and power to explore high risk technology. The authors have developed a new explosive generator design, which we call the Model 632, with which they are attempting to bring the cost of prime pulsed power to 10/sup -3/ dollars per joule and 10/sup -7/ dollars per watt. The design allows the use of inexpensive liquid explosive and attempts to minimize labor costs in construction of the armature and coil. In its first test, which was carried out with only one half of the designed initial energy, the Model 632 produced 18 MJ at 0.85 TW. They discuss the results of the first two tests of the Model 632 explosive generator and project the actual cost of pulse power from this source.

4210 Combustion Systems

REFER ALSO TO CITATION(S) 32471, 32472, 32473, 32474, 32611, 33085, 33379

33441 **Flow-induced vibration in shell-and-tube heat exchangers with double-segmental baffles.** Halle, H.; Chenoweth, J.M.; Wambsganss, M.W. (Argonne National Lab., Argonne, IL). *Heat Transfer Engineering;* 7: No. 3-4, 64-72(1986). Contract W-31-109-ENG-38.

One of the techniques used by designers of shell-and-tube heat exchangers when they encounter a potential flow-induced vibration problem is to shift from a tube bundle with segmental baffles to one with double-segmental baffles. This results in a split of the flow into either half of the shell with lower velocities and makes it possible to reduce the unsupported tube span length while keeping below a given allowable pressure drop. Tests were performed as a part of a systematic study of water flow-induced vibration in industrial-size heat exchangers. Results for nine different double-segmental baffled bundle configurations are presented. Comparison of the results with those for similar segmental baffled bundles shows that higher flows can be tolerated without developing damaging flow-induced vibration.

43 PARTICLE ACCELERATORS

REFER ALSO TO CITATION(S) 33415, 33549, 33895

4301 Design, Development, And Operation

REFER ALSO TO CITATION(S) 34350

33442 (EUR—9618-Vol.1, pp 75-77) **Design, construction and first operation of small heliac, Sheila.** Hamberger, S.M.; Sharp, L.E. 1985. NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803. (CONF-8409392—Vol.1).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

A small heliac has been constructed, with the limited aims of providing experimental checks on computed magnetic surfaces and of gaining some preliminary experience of plasma production and confinement in this new geometry. In addition, experience gained in actual design and construction will prove useful for a future larger device.

33443 (INIS-mf—10889, pp 36) **Electrocurtain (registered trademark) Technical Center in Geneva.** Hugelin, B. (Energy Sciences International, Geneva, Switzerland). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33444 (INIS-mf—10889, pp 73) **Methods of characterization of production capacity of industrial electron accelerators for radiation technology.** Santar, I.; Cadersky, I. Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33445 (INIS-mf—10889, pp 3) **Up-to-date trends in development of electron accelerators for radiation technologies.** Auslender, V.L. (Institute Yadernoj Fiziki, Novosibirsk, USSR). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33446 (INIS-mf—10889, pp 72) **INP accelerators of up to 90 kW power.** Salimov, R.A. (Institute Yadernoj Fiziki, Novosibirsk, USSR). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33447 **(JINR—9-86-418) Dubna synchrophasotron. Operation and improvement (Quarter 3, 1985).** Balgansuren, Ya.; Belushkina, A.A.; Beznogikh, Yu.D. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1986. 3p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702323.

Information is presented on the operation of the synchrophasotron at the acceleration of protons and deuterons in the 3rd quarter, 1985. Particular attention is given to the run of the acceleration of polarized deuterons. The value and the character of polarization in the acceleration and extraction of accelerated deuterons have been controlled and measured with the aid of the physical setups operating in the internal and extracted beams of polarized deuterons. 2 references, 1 table.

33448 **(JINR—9-86-473) Dubna synchrophasotron. Operation and improvement (Quarter 4, 1985).** Glushchenko, V.G.; Doroshenko, A.Z.; Zabolotin, V.P. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1986. 9p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702324.

Information is presented on the operation of the Dubna synchrophasotron in the 4-th quarter, 1985 and throughout the year. Protons and heavier nuclei up to silicon were accelerated. The physical setups operated on internal and ejected beams. The system and operation of control circuts of remote shift of laser ion source target are described. Much attention is given to dicreasing the pulsations of the magnetic field of the synchrophasotron. 7 references, 6 figures, 2 tables.

33449 (JINR—R-9-85-707, pp 37-53) **JINR phasotron commissioning.** Dzhelepov, V.P.; Dmitrievskij, V.P.; Onishchenko, L.M. 1985. (In Russian). NTIS (US Sales Only), PC A16/MF A01. File Number DE87780133. (CONF-8506350—).

From International conference on cyclotrons and their application; Bechine, Czechoslovakia (25 Jun 1985).

Systems of the JINR phasotron with spatial variations of magnetic field and results of its commisioning are described. The phasotron is designed for proton acceleration to 680 MeV at the current of internal beam 10-50 μA. Beam acceleration has been performed in two stages. In 1984 protons were accelerated to the energies of 680 MeV and in 1985 the proton beam was extracted from the accelerator chamber. Extraction factor constitutes 50-70%. Control over radiation situation was realized using automated system of dosimetric control. 25 refs.

33450 (JINR—R-9-85-707, pp 108-112) **Experience of modification of classical cyclotrons.** Sarkisyan, L.A.; Kir'yanov, E.F.; Vorob'ev, Yu.A.; Chernyshenko, T.A.; Ved'manov, G.D.; Neshev, F.G.; Smetanin, G.I.; Ushakov, Yu.A. (Moskovskij Gosudarstvennyj Univ., USSR. Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki; Ural'skij Politekhnicheskij Inst., Sverdlovsk, USSR). 1985. (In Russian). NTIS (US Sales Only), PC A16/MF A01. File Number DE87780133. (CONF-8506350—).

From International conference on cyclotrons and their application; Bechine, Czechoslovakia (25 Jun 1985).

Experience in the modification of classical 120 cm cyclotrons, which are in operation in the USSR, is analyzed. Parameters of ion beams extracted from the cyclotrons after their modification are given. At present works are underway on the development of a powerful pulsed ion source, which will permit to produce high-charge state ions. The acceleration of /sup 8/Ar/sub 40/ ions to the energy of 36 MeV is planned to produce nuclear filters. Low expenses, insignificant structural modifications, short terms, quick tuning of acceleration modes speak in favour of the cyclotron modification. 12 refs.; 2 tabs.

33451 **(JINR-R—9-86-290) SILUND-20 electron linear induction accelerator.** Dolbilov, G.V.; Petrov, V.A.; Fateev, A.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods). 1986. 4p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702375.

The SILUND-20 electron linear induction accelerator designed as an injector for the electron-ring accelerator is described. The beam current at the exit of the accelerator is as high as 1 kA, the energy 2 MeV, the repetition frequency 50 Hz. Five accelerating sections contain 120 inductors made of ferrite cores. A modulator with pulse power amplification by means of time energy compression is used in the pulse system. The modulator forms 30 ns pulse duration with 17 kV voltage amplitude and 35 kA current amplitude that is sufficient for one section supply. The thyratrons TGI1-2500/50 are applied as commutators. The gas discharge between needle cathode and cylindrical anode that are placed in the first section is used in the electron source for the beam forming. The accelerating path on the whole is made of ceramics. The pulse focusing fields with the intensity up to 4 kOe formed with the help of short foil-type coils and smoothing down screens. The field nonuniformity on the axis does not exceed +-6%. The results of the beam characteristics investigations are given. 5 references, 3 figures.

33452 **(NIIEFA-P-V—0728) Peculiarities of application of washer- and disk-loaded structures in standing wave electron linacs.** Andreev, V.G.; Vakhrushin, Yu.P.; Vorogushin, M.F.; Esin, S.K.; Zorina, V.M.; Paramonov, V.V.; Smirnov, Yu.V. (Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad (USSR)). 1986. 24p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702398.

Comparative analysis of washer - and disk-loaded accelerating structures (WDLA) with biperiodic decelerating structures has been carried out. On the basis of calculations and structural study of the system the possibility to use WDLA in electron linacs (EL) is determined. EL structure on the basis of WDLA is described: it is shown that the developed cooling systems and variants of buncher designs, as well as switching of high-frequency input of power in any point of the system, permit to realize compact arrangement of EL on the whole. 24 references, 15 figures, 4 tables.

33453 **The four stage HELIA experiment.** Ramirez, J.J.; Hasti, D.E.; Corley, J.P.; Poukey, J.W.; Prestwich, K.R.; Genuario, R.D.; Nishimoto, H.N.; Fockler, J.J.; Smith, I.D.; D'A Champney, P.; Nielsen, K.E. (Sandia National Labs., Albuquerque, NM 87185). pp 143-146 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—).

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

A four stage, 4 MV, 250 kA, 30 ns accelerator to demonstrate the High Energy Linear Induction Accelerator (HELIA) concept is described. HELIA uses modular, water dielectric, pulse forming lines to drive inductively isolated cavities. A cathode stalk extends the length of the accelerator, adds the voltages from the cavities, and delivers the power to a high voltage anode-cathode gap. The cathode stalk constitutes the inner electrode of a coaxial magnetically insulated transmission line (MITL). The outer electrode of the MITL is not continuous but is interrupted at regular intervals by the cavity feeds. The single cavity experiment demonstrated the performance of individual cavities and pulse forming elements. The four cavity experiment demonstrated the key physics issues of the HELIA concept. The design and performance of the pulsed power driver, induction cavities, and measurements of the power delivered by the MITL to an electron beam load are presented.

4302 Beam Dynamics, Field Calculations, And Ion Optics

REFER ALSO TO CITATION(S) 34351

33454 **(BNL—39613) Improved mesh generator for the POISSON Group Codes.** Gupta, R.C. (Brookhaven National Lab., Upton, NY (USA)). 16 Mar 1987. Contract AC02-76CH00016. 12p. (CONF-870302—132). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87008714.

From Particle accelerator conference; Washington, DC, USA (16 Mar 1987).

This paper describes the improved mesh generator of the POISSON Group Codes. These improvements enable one to have full control over the way the mesh is generated and in particular the way the mesh density is distributed throughout this model. A higher mesh density in certain regions coupled with a successively lower mesh density in others keeps the accuracy of the field computation high and the requirements on the computer time and computer memory low. The mesh is generated with the help of codes AUTOMESH and LATTICE; both have gone through a major upgrade. Modifications have also been made in the POISSON part of these codes. We shall present an example of a superconducting dipole magnet to explain how to use this code. The results of field computations are found to be reliable within a few parts in a hundred thousand even in such complex geometries.

33455 **(FNAL/C—87/49) Combining multipole data.** Michelotti, L. (Fermi National Accelerator Lab., Batavia, IL (USA)). Mar 1987. Contract AC02-76CH03000. 4p. (CONF-870302—82). NTIS, PC A02. File Number DE87007958.

From Particle accelerator conference; Washington, DC, USA (16 Mar 1987).

The problem of combining the information from three sets of magnetic field data for dipole magnets is addressed. Three methods for combining multipole data are described which may be useful under possibly different assumptions: multipole feeddown, expansion in orthogonal functions, and fictitious sources. The methods of multipole feeddown and sources were both tried on the magnet data, with the result that the method of sources worked well. (LEW)

33456 **(IFVE-OKU—86-72) Increase of longitudinal instability threshold due to synchrotron frequencies spread in proton bunches.** Pashkov, P.T.; Smirnov, A.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1986. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702291.

Two ways of increasing synchrotron frequency spread in a bunched proton beam circulating in magnetic field flat-top are compared. Instability thresholds for the lowest multipole modes are practically unchanged, the accelerating voltage amplitude being decreased, and for higher-order modes may be decreased due to multipole mode coupling. On the contrary, after Landau resonator is switched, particle bunch parameters, excluding synchrotron frequency spread, are slightly changed and lowest multipole mode thresholds in practically interesting cases may be increased approximately by an order. Landau resonator may increase instability thresholds in case of higher-order modes, the value of synchrotron frequency natural spread in bunches being sufficiently low. Basic characteristics of Landau resonator for the IHEP accelerators are calculated as an example. 8 references, 1 figure.

33457 (INIS-mf—10902, pp 7) **Theory of nonlinear vibrations applied to particle orbit calculations in accelerators.** Schnizer, B.; Moshammer, H. Dec 1986. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702298.

In Annual report (October 1985 - September 1986).

33458 **(ITEF—63(1986)) Admissible errors of parameters of a focusing channel for an induction linac with intense electron beam. 2. Beam axis deviations.** Plotnikov, V.K. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). 1986. 23p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702313.

The causes of beam axis deviation from the focusing channel axis in the electron inducton linac are considered. The errors of manufacturing and arrangement of focusing elements and vacuum chamber elements are estimated. While calculation the effect of beam proper fields and conducting walls of vacuum chamber is taken into account. The beams with different phase volume value of transverse motion are considered. 6 references, 4 figures.

33459 (JINR—R-9-85-707, pp 133-140) **Technique and results of new measurements of the U-120 M isochronous cyclotron magnetic field.** Lukavski, J.; Chigak, M.; Shul'ts, I. (Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia). 1985. (In Russian). NTIS (US Sales Only), PC A16/MF A01. File Number DE87780133. (CONF-8506350—).

From International conference on cyclotrons and their application; Bechine, Czechoslovakia (25 Jun 1985).

In view of the reconstruction of the U-120 M cyclotron steering magnet coil in 1984 the measurements of magnetic field topography are made. The work was aimed at the refining of previous measurement results and formation of new isochronous fields in induction range from 0.7 to 1.85 T. More than 300 measurements were made. New isochronous fields for p, d, He/sub 3//sup 2+/ on 12 levels, corresponding to currents from 100 to 650 A with a step of 50 A are formed. Dependences of the cyclotron major parameters on the steering coil current are presented. 5 refs.; 3 figs.

33460 (JINR—R-9-85-707, pp 150-154) **Simulation of magnetic structure of the U-120I isochronous cyclotron.** Bezruk, A.I.; Bykov, V.I.; Linev, A.F.; Olejnik, E.E.; Alenitskij, Yu.G. (AN Ukrainskoj SSR, Kiev. Inst. Yadernykh Issledovanij; Joint Inst. for Nuclear Research, Dubna, USSR). 1985. (In Russian). NTIS (US Sales Only), PC A16/MF A01. File Number DE87780133. (CONF-8506350—).

From International conference on cyclotrons and their application; Bechine, Czechoslovakia (25 Jun 1985).

Simulation results of the U-120 I isochronous cyclotron magnetic structure to improve its focusing properties are presented. The method of sector shim orientation accepted for the U-120 I ensures increased values of flatter and helicity in case of a good technological effectiveness of the magnetic structure, improvement of magnetic structure focusing properties in the central region. The character of radial dependence of the average magnetic field presupposes that magnet excitation current of 400 A will permit to operate on the level of field not less than 1.7 T, i.e. to accelerate ions Z/A -> 0.67 to the energies E->40 Z/sup 2//A. 4 refs.; 4 figs.

33461 (JINR—R-9-85-707, pp 242-250) **Theoretical study of the effect of orbit expansion in the central region of the DTs-1 cyclotron.** Dmitrievskij, V.P.; Karamysheva, G.A.; Kol'ga, V.V.; Lomakina, O.V. 1985. (In Russian). NTIS (US Sales Only), PC A16/MF A01. File Number DE87780133. (CONF-8506350—).

From International conference on cyclotrons and their application; Bechine, Czechoslovakia (25 Jun 1985).

The possibility of application of the orbit expansion effect in the injection region of DTs-1 sector cyclotron to increase primary separation of orbits at the unchangeable values of the injection energy and energy gain per the first cycle is considered theoretically. The DTs-1 is supposed to be used for deuteron acceleration in the energy range from 15 to 100 MeV. The energy growth gain is 1 MeV/cycle, injection energy - 15 MeV. The effect of orbit expansion is shown can be used in the central region of the ring sector accelerators to carry out equilibrium orbit spatial density decrease. The dependences of the fundamental field harmonic (B(r)), providing 2.3-2.6 times increase of radial orbit separation in the injection region of DTs-1 cyclotron, have been found; the dynamic characteristics under expansion conditions as well as tolerances for the

values of the B(r) dependence derivatives have been determined. 6 refs.; 5 figs.

33462 (JINR—R-9-85-707, pp 251-257) **Study on the possibility of H/sup -/ and D/sup -/ ions acceleration in the U-120 M cyclotron.** Dmitrievskij, V.P.; Kol'ga, V.V.; Le Kien Tkan'; Bejshovets, V.; Krzhivanek, M.; Trejbal, Z.; Chigak, M. (Joint Inst. for Nuclear Research, Dubna, USSR; Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia). 1985. (In Russian). NTIS (US Sales Only), PC A16/MF A01. File Number DE87780133. (CONF-8506350—).

From International conference on cyclotrons and their application; Bechine, Czechoslovakia (25 Jun 1985).

Investigation of H/sup -/ ion beam properties during acceleration at the U-120M isochronous cyclotron has been carried out in connection with a long-term plan on acceleration of H/sup -/ and D/sup -/ ions. The processes connected with accelerated particle losses due to ion charge-exchange are considered. The aim of this investigation is the calculation of these losses and comparison with the experiment. The dependence of H/sup -/ ion beam intensty on the pressure of a residual gas for the 40 MeV maximum ion energy is based on the results obtained. It is shown that for beam loss decreasing to the acceptable value it is necessary, at least, to decrease by an order the pressure of the residual gas in an accelerating chamber. 10 refs.; 4 figs.

33463 (N—87-20055, pp vp) **High current/high power beam experiments from the space station.** Cohen, H.A. Oct 1986. NTIS, PC A20/MF A01. (NASA-CR—180231; JPL-PUB—86-49; NAS—1.26:180231; CONF-8609284—).

From Workshop on space technology plasma issues in 2001; Pasadena, CA, USA (24 Sep 1986).

In this overview, on the possible uses of high power beams aboard the space station, the advantages of the space station as compared to previous space vehicles are considered along with the kind of intense beams that could be generated, the possible scientific uses of these beams and associated problems. This order was deliberately chosen to emphasize that the means, that is, the high power particle ejection devices, will lead towards the possible ends, scientific measurements in the Earth's upper atmosphere using large fluxes of energetic particles.

33464 **Some design considerations on using modulated intense annular electron beams for particle acceleration.** Lau, Y.Y. (Plasma Theory Branch, Plasma Physics Division, Naval Research Laboratory, Washington, DC 20375-5000). *Journal of Applied Physics;* **62**: No. 2, 351-356(15 Jul 1987).

The space-charge wave and the stability of an intense annular electron beam propagating in a metallic pipe are examined. It is shown that the beam can propagate stably in the parameter regime of some proposed experiments where such a beam is used to generate an electromagnetic wake for particle acceleration. Modulation of an intense beam with a large diameter appears promising at high frequencies.

33465 **Stability of the driving bunch in the plasma wakefield accelerator.** Su, J.J.; Katsouleas, T.; Dawson, J.M.; Chen, P.; Jones, M.; Keinigs, R. (Dept. of Physics, Univ. of California, Los Angeles, Los Angeles, CA 90024). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Plasma Science;* **PS-15**: No. 2, 192-198(Apr 1987).

The authors investigate the stability of the driving electron or positron beam in the plasma wakefield accelerator (PWFA). Although the beam is subject to self-focusing, filamentation, and two-stream instability, they find that all of these can be stabilized by introducing thermal energy and an axial magnetic field.

33466 **E-beam ionized channel guiding of an intense relativistic electron beam.** Frost, C.A.; Godfrey, B.B.; Kiekel, P.D.; Shope, S.L. (to Dept. of Energy). US Patent Application 6-855,529. 25 Apr 1986. 14p. Contract AC04-76DP00789. DE87007237 NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87007237.

An Intense Relativistic Electron Beam (IREB) is guided through a curved path by ionizing a channel in a gas with electrons from a filament, and confining the electrons to the center of the path with a magnetic field extending along the path. The magnetic field is preferably generated by a solenoid extending along the path.

4303 Auxiliaries And Components

REFER ALSO TO CITATION(S) 33336, 33365, 33453, 33466, 34384, 34385

33467 **(GSI—87-4) Emittance growth and space-charge compensation in the transport of intense ion beams.** Schoenlein, A. (Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (Germany, F.R.); Frankfurt Univ. (Germany, F.R.). Fachbereich 13 Physik; Frankfurt Univ. (Germany, F.R.). Inst. fuer Angewandte Physik). Jan 1987. 149p. (In German). NTIS (US Sales Only), PC A07/MF A01. File Number DE87751919.

The aim of the GSI transport experiment was the study of the periodic beam transport at space-charge dominated and at partially compensated ion beams. For this purpose a periodic transport channel was constructed which consisted of 6 periods with each two alternatingly poled magnetic quadrupoles. Faraday cups and beam transformers were available for current measurements. At the entrance and the end of the channel the emittances were measured in both transverse planes. The measurements were performed with Ar/sup 1+/ ions and an energy of 190 keV. The ion currents lied between some μA and 5 mA. The quantity of the rms emittance could be varied from 0.5 mm.mrad to 15 mm.mrad. In agreement with the theoretical considerations the measurement results show that the compensation of the space charge of an ion beam sets on successively. (orig./HSI).

33468 **(IFVE-OUNK—85-127) Measuring coherent betatron oscillation parameters.** Gertsev, K.F.; Mikheev, M.S.; Simonov, A.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1985. 18p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702296.

The technique for measuring beam parameters in a proton synchrotron based on the Fourier analysis of signals of the transverse coherent beam oscillations is described. Betatron frequencies, difference coupling resonance band-width, transverse oscillation spectra are measured. The description of equipment is given, simple algorithms for calculations of these parameters are suggested. Measurement error analysis is carried out. The results of experimental investigation of the technique suggested for the IHEP proton synchrotron, which confirm practical applicability of the these techniques and error estimation, are presented. 5 references, 10 figures.

33469 **(ITEF—101(1986)) Proton synchrotron internal magnetic target.** Gachurin, V.V.; Kats, M.M.; Kondrat'ev, L.N.; Rogal', A.D.; Rusinov, V.Yu. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). 1986. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702315.

A new proton synchrotron internal magnetized iron target is suggested in ITEP. Particles which impinge on target pass directly through iron and are bent by a strong magnetic field in the direction of output. Theoretical consideration of general properties of magnetic targets is carried out, concrete design and results of its testing are described. A 1.8 GeV/c proton beam 30 mm in diameter and with intensity of $(1+-0.1)\times10^{9}$ p/cycle is extracted into the universal channel with extraction angle 3.5 deg and solid angle 2×10^{-4} sr by means of magnetic target at the 7×10^{11} p/cycle intensity of 2 GeV/c proton beam circulating in the synchrotron. Similar magnetic target may be useful for light ion extraction from the accelerator, for spilling the beam part to the running clearance of other extraction devices. 3 references, 3 figures.

33470 (ITEF—145(1986)) **Four-flag drive for input of internal targets at a cyclic accelerator.** Gachurin, V.V.; Sokolov, L.I. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). 1986. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702319.

A new method of a rapid replacing of internal targets at a cyclic accelerator is proposed. The design of a drive with four changeable targets is described. Application of a vacuum seal (of Wilson type) both for the target position adjustment in the radial direction and for target replacing, appears to be the design peculiarity. 2 references, 6 figures.

33471 (JINR—8-86-368) **Results of preliminary tests of an external cryogenic system for the SPIN superconducting synchrotron.** Agapov, N.N.; Batin, V.I.; Belushkin, V.A.; Krylov, V.V. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1986. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702321.

Results of testing elements of an extermal cryogenic system for the SPIN superconducting synchrotron are discussed. A cooling circuit of the refrigerator is considered providing the most effective performance of cooling. Experimental characteristics of the KGU-1600/4,5 cryogenic helium refrigerator are presented for simultaneous production of cold and liquid helium. The characteristics are taken for different combinations of the equipment: with a throttle and a steamliquid expansion engine, on two and three turboexpanders at the stage of preliminary cooling, with and without the use of liquid nitrogen. Heat fluxes to the cryogenic helium tubings with a total length of 160 m are determined. The possibility of using TsTG-0.5/0.7 liquid helium tank as a buffer capacity is considered. Allowable heat fluxes to the liquid helium in SPIN are estimated at which reliable refrigeration of the magnet can be achieved. 4 references, 5 figures.

33472 (JINR—9-86-289) **Technique of measuring electron ring current of KUTI accelerator by synchrotron radiation in infrared region.** Mal'tsev, A.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods). 1986. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702322.

Technique of measuring the electron ring current in the compressor of collective accelerator by the intensity of synchrotron radiation in a long-wave region of spectra (— 1 μm) is described. The results of measurement of electron ring current parameters in the heavy ion collective accelerator prototype are presented. 13 references, 7 figures.

33473 (JINR—9-86-503) **Efficiency evaluation of slow extraction from the synchrotron.** Kazarinov, N.Yu.; Mikhajlov, V.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1986. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702325.

Analytical calculation of slow extraction of the beam out of the JINR synchrotron is made. The formulae for evaluation of the sextupole amplitudes and phases, quadrupole lens gradient range are obtained, the connection with circulated and extracted beam parameters is shown. The formulae for calculating optimal position of the septum-magnet or electrostatic septum are presented. On this basis the formula for estimating the efficiency of beam slow extraction out of the synchrotron is obtained under assumption that in the septum region during the extraction a quasistationary distribution of the beam density occurs. 2 references, 2 figures.

33474 (JINR—D-13-85-793, pp 202-205) **Function generator for control of power supplies for magnets of the SPIN model superconducting synchrotron.** Parfenov, A.N.; Pilyar, A.V. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

A function generator for control of power supplies for magnets of the SPIN superconducting synchrotron is described. The generator operates in the mode of piece-rectangular approximation. A 16-digit analog-to-digital converter performed as a portable module is utilized here. This permits to position it not far from the control object, essentially reducing noise effect on output signals. The generator has a memory device of large capacity (4096 24-digit words) used for storage of function values and argument increments. The generator is constructed in the CAMAC standard. Amplitude of output voltage is +-10 V, dynamic range of output signals is 2/sup 16/.

33475 (JINR—D-13-85-793, pp 438-442) **On-line control system for KUTI-20 heavy ion collective accelerator.** Dubovik, L.V.; Inkin, V.D.; Nikolaev, V.P.; Saenko, T.P. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

The structure and design peculiarities of the control system for the first part of the KUTI-20 heavy ion collective accelerator comprising the SILUND-20 linear induction accelerator and Adhesator-20 charged toroide adiabatic generator are considered; electron ring shaping and their loading with ions is realized in the generator. The control system has centralized hierarchial structure with autonomous subsystems. The system includes the SM-4 minicomputer equipped with a set of external devices; the SM-4 is interfaced with two the "Electronika-60" and one the KM001 microcomputers by means of the KI021 series interframe communication units. The "Elektronika-60" microcomputers are equipped with memory units and interfaces for connection of CAMAC equipment.

33476 (JINR—D-13-85-793, pp 443-447) **On-line control of the proton linac 100-kV injector.** Andreev, V.A.; Antipin, S.V.; Kolomiets, A.A.; Kutsenko, V.A.; Smolyakov, A.F.; Shvachkin, V.B. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

The structure and functional peculiarities of the control system for a linear proton accelerator injector are considered. The system comprises the central computer (the MERA-60 microcomputer) and 2 satellite microcomputers (the "Elektronika-60"). The number of controlled parameters is 22, 13 of which determine the moment of pulsed unit operation. Software of the system is realized in the RT-11 operating system and written in FORTRAN and MACRO-11 languages.

33477 (JINR—D-13-85-793, pp 448-452) **On-line system for a neutron generator control.** Ehkshtejn, P.; Shvarts, R.; Glajsberg, F. (Technische Univ., Dresden, German Democratic Republic. Sektion Physik). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

An on-line multiprocessor system for high-intense neutron generator control is described. The 300 keV electrostatic accelerator is used as the generator. The system operates in the open-circuit regime. The AMSA 80 microcomputer is used in it as the main computer.

33478 (JINR—D-13-85-793, pp 453-456) **On-line measurement system for the SIRIUS electron synchrotron.** Eponeshnikov, V.N.; Lashchuk, N.A.; Neelov, S.M.; Ostrast', M.S.; Pashechnik, Yu.I.; Sidorenko, S.P. (Tomskij Politekhnicheskij Inst., USSR. Inst. Yadernoj Fiziki, Ehlektroniki i Avtomatiki). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

A hadrware of an on-line system for scientific studies at the SIRIUS electron synchrotron is considered. The "Electronika-100-25" is the central computer, it is used for processing incoming data, for calculations of control effects and development of new soft-

ware. Alongside with the developed means of data representation the system is rather flexible for changing operating modes of the synchrotron.

33479 (JINR—D-13-85-793, pp 457-461) **Microprocessor system of dosimetric control at the JINR phasotron.** Gromov, V.O.; Onishchenko, L.M.; Sidorov, V.T.; Shishkin, A.L. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

A system for continuous dosimetric control of radiation conditions in experimental rooms at the JINR phasotron is described. The system contains ionizing radiation detectors placed in points of constant monitoring, devices for control pulse shaping, equipment for data recording and output on the basis of the KM001 microcomputer performed in the CAMAC standard, auxiliary units and the second KM001 computer operating in the conversational mode with the operator.

33480 (JINR—D-13-85-793, pp 266-267) **Design and application of an interactive display system in the Laboratory of High Energies of JINR.** Bazylev, S.N.; Baskakov, A.E.; Senner, A.E.; Senner, L.A.; Slepnev, V.M.; Trofimov, V.V.; Shutova, N.A. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

A multicomputer complex for representation of calculation results in graphical form is described in brief. The complex comprises connected in-series the ES-1055M computer, the MISKA microcomputer realized on the base of the INTEL-8080 microprocessor and the TRA-70 computer servicing the GD-71 graphic display. The considered system is utilized for visualization of the results of calculation and optimization of magnetic channels for charged particle beam transport.

33481 (JINR—D-13-85-793, pp 306-309) **Automation of installation for hadronic atom studying at the IHEP accelerator.** Denisov, A.S.; Grigor'ev, B.V.; Zhelamkov, A.V. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

Problems of automation of the facility on the base of a grating X-ray spectrometer used for the study of hadron atoms at the 70 GeV IHEP proton synchrotron are discussed. The facility comprises a system for measuring proton beam characteristics permitting to determine position and dimensions of the bunch along the accelerator parth, number of protons in the bunch and timing structure of the bunch, spectrometer for detection of hyperon atoms produced in the target, CAMAC means for measurement automation and control as well as the SM-3 computer.

33482 (JINR—D-13-85-793, pp 336-339) **TRA-LSI/CAMAC data acquisition system at the ATOMKI Cyclotron Laboratory, Debrecen.** Paal, A.; Sepsy, K.; Vass, A. (Magyar Tudomanyos Akademia, Debrecen. Atommag Kutato Intezete). 1985. NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

A multi-purpose data acquisition system with distributed intelligence designed for the MGC-20 type compact isochronous cyclotron is discussed. The system consists of PDP-11 compatible computers connected by a medium speed local network. The TPA-11440 computer serves for off-line data analysis, data archivation and program development. A measuring setup is constructed mainly from CAMAC modules and interfaced to a work station by Al-type crate controller. The functions of a programmable multichannel analyzer are emulated by CAMAC modules and a special software. The accumulation of single spectra is based on a CAMAC memory with a capacity of 16Kx24 bits. The acquisition operation can be monitored on a VT55 type terminal of the workstation. It is possible to display simultaneously two spectra with a horizontal resolution of 512 points each. The system provides simultaneous accumulation of single spectra from different detectors, servicing coincidence measurements, experiment monitoring, data recording on tape, simultaneously running an experiment, testing another experimental setup and analysing previously acquired data.

33483 (JINR—R-9-85-707, pp 196-201) **Cyclotron HF injector.** Glazov, A.A.; Kochkin, V.A.; Novikov, D.L.; Samsonov, E.V. 1985. (In Russian). NTIS (US Sales Only), PC A16/MF A01. File Number DE87780133. (CONF-8506350—).

From International conference on cyclotrons and their application; Bechine, Czechoslovakia (25 Jun 1985).

Consideration of alternative variants of injection into a cyclotron, being capable of forming a micropulse with duration upto the tenth of a nanosecond, has lead to construction of a high-frequency injector based on a quarter - wave coaxial resonator. In the resonator, consisting coaxial copper tubes, a high-frequency field with the frequency, being equal to the frequency of the cyclotron accelerating voltage, is excited. In the resonator central electrode of the cyclotron electron model the electron source in the form of a tungsten filament is placed. The whole construction of the injector has a clearance of 2 m, the external electrode being 55 mm in diameter. The mean intensity of a cyclotron beam with the high-frequency injector will be in the range from tens to hundreds of microamperes, when using the ion source, which is capable to provide ion emission above 100 mA. At the optimal ratio between the diameter of external and internal electrodes the high-frequency injector can consume upto 30-40 kW, when the diameter of the external electrode being 30-40 cm. 6 refs.; 4 figs.

33484 (JINR—R-9-85-707, pp 122-132) **Choice of the protection circuit of the DTs-1 cyclotron superconducting coil.** Zaplatin, N.L.; Samsonov, E.V. 1985. (In Russian). NTIS (US Sales Only), PC A16/MF A01. File Number DE87780133. (CONF-8506350—).

From International conference on cyclotrons and their application; Bechine, Czechoslovakia (25 Jun 1985).

Different protection circuits of superconducting (SC) coil for the DTs-1 cyclotron, designed for deuteron acceleration to 100 MeV, are considered. SC magnet consists of four sector SC magnets with total stored energy of — 20 MJ. Average current density in the coil cross section constitutes — 100 A/mm/sup 2/. Circuits of energy transfer to the external resistance and circuits with energy absorption inside the cryostat are considered. It is shown, that when protection system with energy transfer to the external resistance is used, the maximum temperature inside the coil constitutes — 450 K at the maximum voltage 1 kV.

33485 (JINR—R-9-85-707, pp 159-162) **Stabilization of accelerating voltage amplitude on cyclotron dees.** Il'matov, S.T. (AN Kazakhskoj SSR, Alma-Ata. Inst. Yadernoj Fiziki). 1985. (In Russian). NTIS (US Sales Only), PC A16/MF A01. File Number DE87780133. (CONF-8506350—).

From International conference on cyclotrons and their application; Bechine, Czechoslovakia (25 Jun 1985).

The first stabilization loop of high-frequency structure of the isochronous cyclotron, which consists of five-cascade high-frequency generator (HFG), two quarter-wave resonators, shortened by the capacitance of 180 deg dees, being its loading, is described. The HFG connection with the loading is realized via a feeder 28 m long with wave resistance 60 Ohm. The output power of the generator is 300 kW, and frequency stability is 3 x 10/sup -5/. Stability of accelerating voltage of the order 10/sup -2/-10/sup -3/ is attained by the introduction of accelerating voltage amplitude automatic stabilization system (ASS). ASS is a one-circuit static system of HF voltage envelope automatic regulation. The measurements have shown that accelerating voltage stability in the pulse regime at on-eff-time ratio 2-100 in the range of operation frequencies from 8.5 to 18.5 MHz is not worse than 5 x 10/sup -3/. 6 refs.; 3 figs.

33486 (JINR—R-9-85-707, pp 186-190) **Use of vacions in th U-400 heavy ion cyclotron chamber.** Vojnyak, B.; Ivanenko, A.I.; Tumanov, K.D. 1985. (In Russian). NTIS (US Sales Only), PC A16/MF A01. File Number DE87780133. (CONF-8506350—).

From International conference on cyclotrons and their application; Bechine, Czechoslovakia (25 Jun 1985).

It is suggested, that electrode units of the NORD type sputter ion pumps should be installed in magnetic gap to improve vacuum characteristics of the U-400 cyclotron. The gas pumping is realized by means of their absorption by titanium film, sprayed during high-voltage discharge in the accelerator magnetic field. The main characteristics of sputter - ion pump for the U-400 are presented. When the U-400 operates in the pumping regime the pressure at the level of 5 x 10/sup -6/ Tor is steadily maintained in the vacuum volume by 14 units of the discharge-type pump, which corresponds to capacity of about 1000 liters. second/sup -1/. The increase in ion current constituted 12% in the process of operation with sputter-ion pump. 6 refs.; 6 figs.

33487 (JINR—R-9-85-707, pp 235-239) **Digital processing TV image in the external beam monitoring system.** Bejshovets, V.; Chigak, M.; Shturov, Ya.; Rezvov, B.A.; Yudin, L.I. (Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia; Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1985. (In Russian). NTIS (US Sales Only), PC A16/MF A01. File Number DE87780133. (CONF-8506350—).

From International conference on cyclotrons and their application; Bechine, Czechoslovakia (25 Jun 1985).

Investigation results of possible on-line control of deuteron beam space parameters at the cyclotron are presented. The possibility of correction of its position in operation, using a high-sensitive profile indicator together with the digital processing TV image device, is estimated. Quantitative and qualitative possibilities of the monitoring system are shown. The system spatial resolution is — 1 mm. The experiments carried out confirmed the possibility of designing a qualitatively new high-sensitive device for on-line continuous control of a profile, width, displacement of density maximum of the accelerated particle beam from the ion-guide axis without beam chopping. The development of the on-line system for beam position correction in the ion-guide or in the target region is possible. 2 refs.; 2 figs.

33488 (JINR-R—9-85-707, pp 177-185) **Heavy ion cyclotron sources of the JINR Laboratory for Nuclear Reactions. Present status and prospects of development.** Kutner, V.B.; Oganesyan, Yu.Ts.; Pasyuk, A.S.; Tret'yakov, Yu.P.; Flerov, G.N. 1985. (In Russian). NTIS (US Sales Only), PC A16/MF A01. File Number DE87780133. (CONF-8506350—).

From International conference on cyclotrons and their application; Bechine, Czechoslovakia (25 Jun 1985).

Modern status of the JINR multicharged ion sources is considered. Parameters of ion beams, accelerated in the JINR cyclotrons, are presented. It is shown that arc sources of multicharged ions are the basis for the development of cyclotron complex and they provide for the whole range of accelerated particles. The principle possibility to realize a laser ion source for the acceleration of ion beams from laser plasma using the U-200 is shown on the basis of experimental results. The intensity of ion beams attained presently constitutes 10/sub s//sup 10(sub -1/ at the laser operation frequency 1 Hz and ion beam pulse duration up to 10/sub μs/. 13 refs.; 7 figs.

33489 (JINR-R—9-85-707, pp 219-224) **On-line control and measurement system of the U-120 M cyclotron.** Novotny, P.; Chigak, M.; Shul'ts, I. (Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia). 1985. (In Russian). NTIS (US Sales Only), PC A16/MF A01. File Number DE87780133. (CONF-8506350—).

From International conference on cyclotrons and their application; Bechine, Czechoslovakia (25 Jun 1985).

The description of the on-line control and measurement system of the U-120M isochronous cyclotron is carried out. The M 6000 computer is a control computer. At present the substitution of the M 600 computer for the computer complex based on the ADT 4500-type computer and by M3T 300 intellectual terminals is prepared. 6 refs.; 2 figs.

33490 (KIYI—86-9) **Investigation of dose dependences of electric conductivity of solids in charged particle accelerators using computers and CAMAC systems.** Vikhlij, G.A.; Karpenko, A.Ya.; Olejnikov, L.N.; Tarabrova, L.I.; Tkach, N.M. (AN Ukrainskoj SSR, Kiev. Inst. Yadernykh Issledovanij). 1986. 30p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702387.

The devices for the irradiation of specimens of solids by high-energy (25-100 MeV) charged particles within the wide temperature ranges (100-400 K), the automated system for irradiation control and investigations of dose dependences on the base of the IVK-1, IVK-2 computerized measuring complexes and commercial digital instruments and software are described. The devices described were used for investigation of dose dependences of electric conductivity of indium antimonides at the Kiev cyclotron. 4 references, 5 figures.

33491 (NIIEFA-P-A—0678) **Method for calculating temperature regime of a target irradiated by a charged particle beam under induced motion of a subheated liquid.** Divavin, V.A.; Bolotova, E.D. (Tsentral'nyj Nauchno-Issledovatel'skij Inst. Informatsii i Tekhniko-Ehkonomicheskikh Issledovanij po Atomnoj Nauke i Tekhnike, Moscow (USSR)). 1985. 16p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702392.

Method for calculating temperature state of nonisothermal target surface irradiated by a charged particle beam under conditions of local surface boiling at induced motion of subheated coolant is developed. Possibility of stable coexistence of nucleate and film boiling is taken account of by the problem statement. Heat exchange boundaries for thee temperature are given in the function of hydrodynamic, thermal physical and geometric flow parameters. Anambiguous character of solving differential heat transfer equation due to hysteresis character of the temperature dependence on released power, the beam current being independent, is shown. A good agreement of between calculation results and results of experiments of other authors is obtained. 15 references, 6 figures.

33492 (NIIEFA-P-D-B—0689) **System for formation of accelerator irradiation field for industrial radiography.** Ovchinnikov, V.P.; Sukharev, Yu.V.; Tolstun, N.G.; Lamzin, E.A. (Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad (USSR)). 1985. 16p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702395.

Technique and results of numerical and experimental investigations into the formation system of irradiation field with extended rotary magnet of accelerators for radiation technology are considered. Calculation of field in rotary magnet was performed in two-dimensional approximation. Comparison of trajectory analysis results with experimental data confirms rightfulness of such approximation. Two versions of structural design of rotary magnet were investigated, recommendations on their applications are given. Fabrication of and operation of the formation system considered are simple and it can be widely used owing to its advantages and to decreasing accelerator dimensions reached at that. 7 references, 9 figures.

33493 (NIIEFA-P-SIU—0717) **Efficiency of quasirectangular voltage pulse shaping in the circuit of a generator with inductive energy storage and controlled loading.** Gusev, O.A.; Il'in, B.N.; Mellekh, E.M.; Pavlov, E.P.; Pecherskij, O.P.; Spitsyn, G.A.; Shchegolikhin, N.P. (Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad (USSR)). 1986. 29p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702396.

Analysis of efficiency of shaping the flat-top pulse voltage in the circuit of generator with inductive energy storage and controlled loading is carried out. It is shown, that energy losses are minimal in case of sawtooth leading edge of the pulse and sine-shaped trailing edge. Some experimental results on shaping quasirectangular accelerating voltage pulses in a pulse supply system with high-voltage inductive energy storage are presented. 13 references, 18 figures.

33494 **(NIIEFA-P-V—0700) Analysis of thermal regimes of foil extraction windows of electron accelerators.** Mamykin, V.N.; Tikhomirov, A.S. (Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad (USSR)). 1985. 16p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702397.

Thermal conditions of foil of axial-symmetrical window for electron accelerator for two current density distributions in a beam were determined. Limiting frequences for different thermal conditions in foil were determined as well as pulse duration value tau at which temperature is proportional to tau. Expressions unambigously determining limiting beam current, which with chosen beam energy and its diameter in foil cross section can be passed through a window with thicknss h, with chosen beam energy and its diameter in foil cross section, were obtained. It is possible to increase limiting power passed through foil varying beam parameters and outlet window structure within permissible limits. Dependences obtained permit to choose the most suitable foil and cooling method. Titanium foil is preferable to use on intensive cooling with air, aluminium - in a pulsed regime of foil heating and on cooling with thermal conduction. 3 references, 6 figures.

33495 **(SLAC-PUB—4218) The pulsed amplitude unit for the SLC.** Rolfe, J.; Browne, M.J.; Jobe, R.K. (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). Feb 1987. Contract AC03-76SF00515. 3p. (CONF-870302—121). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87008874.

From Particle accelerator conference; Washington, DC, USA (16 Mar 1987).

There is a recurring requirement in the SLC for the control of devices such as magnets, phase shifters, and attenuators on a beam-by-beam basis. The Pulsed Amplitude Unit (PAU) is a single width CAMAC module developed for this purpose. It provides digitally programmed analog output voltages on a beam-by-beam basis. Up to 32 preprogrammed values of output voltage are available from the single analog output of the module, and any of these values can be associated with any of the 256 possible SLC beam definitions. A 12-bit Analog-to-Digital Converter (ADC) digitizes an analog input signal at the appropriate beam time and stores it in a buffer memory. This feature is normally used to monitor the response of the device being controlled by the PAU at each beam time. Initial application of the PAU is a part of the system that controls the output of Klystrons in the SLC. The PAU combines several different functions in a single module. In order to accommodate these functions in a single width CAMAC module, field programmed logic is used extensively. Field Programmable Logic Arrays, Programmed Array Logic, and a Field Programmable Logic Sequencer are employed.

33496 **Vacuum performance of the ultraviolet and x-ray rings at the National Synchrotron Light Source.** Halama, H.J.; Foerster, C.L.; Kobari, T. (Brookhaven National Laboratory, Upton, New York 11973). *Journal of Vacuum Science and Technology, A: Vacuum, Surfaces, and Films;* **5**: No. 4, 2342-2345(Jul 1987). Contract AC02-76CH00016.

The gas density and its composition expressed in partial pressures of various gases determine the lifetime of circulating current through bremsstrahlung and Coulomb scattering losses. The above quantities depend primarily on the gas desorption due to synchrotron radiation and on the installed pumping speed. During operation of the storage rings, the pressure decreases as the walls of the vacuum system are cleaned by synchrotron radiation. Since long lifetime is essential for good operation of all storage rings, accurate information on pressure around the ring should be available. Calibrated Bayard—Alpert gauges and residual gas analyzers have been installed in both rings. From their readings, average pressure and gas composition are evaluated and the beam lifetime calculated. In this paper we will present (a) National Synchrotron Light Source pressure measuring system, (b) time-dependent pressure and lifetime behavior, and (c) comparison of calculated lifetimes with measured lifetimes.

33497 **Vacuum-to-air interface for the advanced test accelerator.** Cruz, G.E.; Erikson, E.D.; Schwab, T.L. (Lawrence Livermore National Laboratory, University of California, Livermore, California 94550). *Journal of Vacuum Science and Technology, A: Vacuum, Surfaces, and Films;* **5**: No. 4, 2352-2354(Jul 1987). Contract W-7405-ENG-48.

The operation of some future accelerators will require that a pulsed particle beam exit a region which is at a pressure of 10^{-6} Torr or less into a region which is at atmospheric pressure. The separation between atmosphere and vacuum could be achieved with small apertures or differential pumping stages. In this paper we report some of the results of tests carried out on a component which could be used as the first stage of a differentially pumped system. The component employs an expendable foil and foil advancement mechanism which serve as both an orifice and a fast-acting vacuum valve. In operation, the particle beam penetrates the thin foil, thereby creating an aperture of minimum geometry between the atmosphere and the vacuum system. The beam duration is on the order of 70 to 100 ns. During the balance of the (1-s) cycle, the foil is advanced to seal the opening and recover the loss in vacuum. A series of differentially pumped stages will be used to further separate the two pressure regimes. The design goal for this first stage was to achieve a pressure reduction of 760:1. Our test results show that for a 1-mm-diam orifice, undergoing multiple cycles, the system pressure rise is approximately 1.7 Torr/cycle and for a 10.0-mm-diam orifice, the pressure rise is approximately 2.9 Torr/cycle. The gas throughput for the 10-mm orifice was approximately 9700 Torr l/s. Future objectives include the further reduction of the system pressure rise in order to maintain 1.0 Torr or less during the 1-s cycle time.

33498 **Modification of a gas jet transport system for the supression of heavy-mass fission product homologues.** Zendel, M.; Prussin, S.G.; Rengan, K.; Massey, T.N.; Meyer, R.A. (California Univ., Berkeley, USA. Dept. of Nuclear Engineering; Lawrence Livermore National Lab., CA, USA. Nuclear Chemistry Div.). *NIMRD;* **256**: No. 1, 180-183(15 Apr 1987).

The uranium target of a gas jet transport system for fission products has been modified by the addition of an aluminum cover foil. The new modification allows fission fragments of low mass to enter a continuous chemistry system while heavier fragments are stopped in the aluminum. The elimination of the heavier homologues allows development of simpler and faster chemical separation procedures. In addition, since the lighter fragments are slowed down by the cover foil a smaller target chamber can be used. This leads to a reduction in system holdup time.

33499 **Confined ion beam sputtering device and method.** Sharp, D.J. (to Dept. of Energy). US Patent Application 6-844,035. 25 Mar 1986. 21p. Contract AC04-76DP00789. DE87007221 NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87007221.

A hollow cylindrical target, lined internally with a sputter deposit material and open at both ends, surrounds a substrate on which sputtered deposition is to be obtained. An ion beam received through either one or both ends of the open cylindrical target is forced by a negative bias applied to the target to diverge so that ions impinge at acute angles at different points of the cylindrical target surface. The ion impingement results in a radially inward and downstream directed flux of sputter deposit particles that are received by the substrate. A positive bias applied to the substrate enhances divergence of the approaching ion beams to generate a higher sputtered deposition flux rate. Alternatively, a negative bias applied to the substrate induces the core portion of the ion beams to reach the substrate and provide ion polishing of the sputtered deposit thereon.

33500 **Transient response characterization of waveform recorders.** Souders, T.M.; Flach, D.R.; Schoenwetter, H.K. (Electronic Instrumentation and Metrology, Electrosystems Div., National Bureau of Standards, Gaithersburg, MD 20899). pp 352-355 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—).

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

Test methods for characterizing the transient response of waveform recorders are presented, together with typical test results. The methods, based on the use of a precision, programmable step generator developed at NBS, are suitable for recorders having up to 10 bits of resolution and 100 MHz bandwidth.

33501 **Supermite vacuum interface design.** Moore, W.B.; Stinnett, R.W.; McDaniel, D.H. (Sandia National Labs., Albuquerque, NM). pp 315-318 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—). Contract AC04-76DP00789.

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

A new water-plastic-vacuum interface has been designed for Sandia Laboratory's Supermite (2.8 MV, 2.2 ohm) accelerator. This design was based on the PBFA I vacuum interface. Electrostatic field plots show that in positive polarity the water feed to the PBFA I interface will fail at 2 MV on Supermite. This is confirmed by positive polarity experiments and field plots using the PBFA I style vacuum interface at the Naval Research Labs. Modifications to the water section geometry to increase the water breakdown strength in positive polarity result in equivalent electric field grading at the plastic-vacuum interface but allow positive polarity operation at voltages up to 3.1 MV. This is accomplished by incorporating a dielectric field shaper which significantly improves the electric field grading across the insulator.

33502 **A 10-MHz high-voltage modulator with pulse-width and repetition-rate agility.** Krausse, G.J. (Los Alamos National Lab., Los Alamos, NM 87545). pp 828-833 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—).

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

Requirements for control and rapid switching of the proton beam at the Los Alamos Meson Physics Facility (LAMPF) are continually revised to support accelerator upgrades and modifications. A recent upgrade required the development of a 10-MHZ high-voltage modulator for an electrostatic kicker with real-time control of pulse width and repetition rate over a range of four decades. The modulator must be capable of producing a voltage pulse across a capacitive load with a rise time of ≦20 ns (10%-90%). In addition the falling edge undershoot must be controlled to less than one part in 10/sup 3/. The following paper describes in detail the circuit design philosophy, layout, and critical areas in system design.

33503 **Low inductance diode design on the Proto II accelerator for imploding plasma loads.** Hsing, W.W.; Coats, R.; McDaniel, D.H.; Spielman, R.B. (Sandia National Labs., Albuquerque, NM). pp 704-707 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—). Contract AC04-76DP00789.

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

A new water transmission line convolute, single piece insulator, and double disk feed has been designed and tested on the .125 ohm, 10 TW Proto II accelerator. The water transmission lines have a 5 cm gap to eliminate any water arcing. A two-dimensional magnetic field code was used to calculate the convolute inductance. The authors used an acrylic insulator as well as a single piece, laminated polycarbonate insulator. They have been successfully tested at over 90% of the Shipman criteria for classical insulator breakdown, although the laminations in the polycarbonate insulator failed after a few shots. The anode and cathode each have two pieces and are held together mechanically. The vacuum MITL tapers to a 3 mm minimum gap. The total inductance is 8.4 nH for gas puff loads and 7.8 nH for imploding foil loads.

33504 **Modelling of the PROTO II crossover network.** Proulx, G.A.; Lackner, H.; Spence, P.; Wright, T.P. (Pulse Sciences, Inc., 14796 Wicks Blvd., San Leandro, CA 94577). pp 507-510 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—).

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

In order to drive a double ring symmetrically fed bremsstrahlung diode, the PROTO II accelerator was redesigned. The radially converging triplate water line was reconfigured to drive two radial converging triplate lines in parallel. The four output lines were connected to the two input lines via an electrically enclosed tubular crossover network. Low voltage Time Domain Reflectrometry (TDR) experiments were conducted on a full scale water immersed model of one section of the crossover network as an aid in this design. A lumped element analysis of the power flow through the network was inadequate in explaining the observed wave transmission and reflection characteristics. A more detailed analysis was performed with a circuit code in which we considered both localized lumped-element and transmission line features of the crossover network. Experimental results of the model tests are given and compared with the circuit simulations.

33505 **Anode and cathode joints and gap closure in a high current MITL.** Spielman, R.B.; Hsing, W.W. (Sandia National Labs., Albuquerque, NM). pp 496-498 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—). Contract AC04-76DP00789.

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

Proto II successfully delivers up to 5 MA to an imploding plasma load through an MITL with gaps as small as 3.0 mm. The anode and the cathode have joints which, under some conditions, may cause gap closure. The authors postulate that the gap closure occurs due to acceleration of negative ions from the cathode joint to the anode. Inserting conducting material into the cathode joint eliminated MITL gap closure.

33506 **Cascade switch implementation on PBFA I.** Bloomquist, D.D.; Montry, G.R.; Downie, S.E.; Peterson, G.R. (Sandia National Labs., Albuquerque, NM). pp 266-269 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—). Contract AC04-76DP00789.

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

The triggered gas switches in PBFA I were recently changed from a single gap trigatron design to a 15-stage cascade design with a relatively short triggered gap. This improved design provides a low jitter value and has an extremely low probability of prefire. The triggered section represents about one-third of the total voltage of the switch and is triggered with a pin configuration similar to the previous trigatron design. The fields in the triggered gap were adjusted to allow prompt triggering and yet avoid prefires in the trigger gap at the operating gas pressure. Operating parameters of the switch are discussed along with an analysis of the improved machine performance with respect to jitter, prefire probability, and operating voltage.

33507 **Surface discharges as intense photon sources in the extreme ultraviolet.** Woodworth, J.R.; Maenchen, J.E.; McKay, P.F. (Sandia National Labs., Albuquerque, NM 87185). pp 563-566 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—). Contract AC04-76DP00789.

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

The authors have been investigating surface discharges as XUV photon sources for in-situ cleaning and preionizing of anode surfaces in light-ion-fusion accelerators. In these experiments the surface discharge was formed by discharging a capacitor bank across a spark gap which consisted of two copper electrodes attached to an insulator and facing each other across a 5.5-mm gap. The surface discharge and its power feeds were constructed in a stripline configuration to minimize system inductance. When the surface discharge was driven by a 2.9-μF, 45-kV capacitor bank, the peak current thru the discharge was —250 kA. When driven at these levels, a single discharge radiated with a peak power of over 80 megawatts of 10-to-70 eV photons and had a total XUV output energy of 60 Joules per pulse. XUV illumination of the anode of Sandia's PBFA-I Accelerator significantly improves the diode impedance characteristics.

33508 **A high speed multi-channel data recorder to replace oscilloscope data acquisition systems.** Filter, W.F.; Chang, J.; Landron, C.O.; Lockwood, G.J.; Muron, D.J.; Neyer, B.T.; Ruggles, L.E. (Sandia National Labs., Div. 1234, P.O. Box 5800, Albuquerque, NM 87185). pp 172-178 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—).

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

A photonic high speed analog data recording system previously developed in the laboratory has been used for the first time in the operational environment of a large pulsed power accelerator. The authors demonstrate a retrofit capability of this system by recording waveforms from analog electrical sensors using laser diode transmitters. This paper describes a key component of the system, a prototype High Speed Multi-Channel Data Recorder, and its application on the Sandia HydraMITE II accelerator.

33509 **MABE multibeam accelerator.** Hasti, D.E.; Ramirez, J.J.; Coleman, P.D.; Huddle, C.W.; Sharpe, A.W.; Torrison, L.L. (Pulsed Power Development Div., Sandia National Labs., Albuquerque, NM 87185). pp 147-150 of Digest of technical papers of the 5th IEEE pulsed power conference. Turchi, P.J.; Rose, M.F. Piscataway, NJ; IEEE Service Center (1985). (CONF-850616—). Contract AC04-76DP00789.

From 5. IEEE pulsed power conference; Washington, DC, USA (10 Jun 1985).

The Megamp Accelerator and Beam Experiment (MABE) was the technology development testbed for the multiple beam, linear induction accelerator approach for Hermes III, a new 20 MeV, 0.8 MA, 40 ns accelerator being developed at Sandia National Laboratories for gamma-ray simulation. Experimental studies of a high-current, single-beam accelerator (8 MeV, 80 kA) and a nine-beam injector (1.4 MeV, 25 kA/beam) have been completed, and experiments on a nine-beam linear induction accelerator are in progress. A two-beam linear induction accelerator is designed and will be built as a gamma-ray simulator to be used in parallel with Hermes III. The MABE pulsed power system and accelerator for the multiple beam experiments is described. Results from these experiments and the two-beam design are discussed.

4304 Storage Rings

REFER ALSO TO CITATION(S) 33496

33510 **(BNL—39404) The AGS-Booster lattice.** Lee, Y.Y.; Barton, D.S.; Claus, J.; Cottingham, J.G.; Courant, E.D.; Danby, G.T.; Dell, G.F.; Forsyth, E.B.; Gupta, R.C.; Kats, J. (Brookhaven National Lab., Upton, NY (USA)). 1987. Contract AC02-76CH00016. 4p. (CONF-870302—87). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87007632.

From Particle accelerator conference; Washington, DC, USA (16 Mar 1987).

The AGS Booster has three objectives. They are to increase the space charge limit of the AGS, to increase the intensity of the polarized proton beam by accumulating many linac pulses (since the intensity is limited by the polarized ion source), and to reaccelerate heavy ions from the BNL Tandem Van de Graaff before injection into the AGS. The machine is capable of accelerating protons at 7.5 Hertz from 200 MeV to 1.5 GeV or to lower final energies at faster repetition rates. The machine will also be able to accelerate heavy ions from as low as 1 MeV/nucleon to a magnetic rigidity as high as 17.6 Tesla-meters with a one second repetition rate. As an accumulator for polarized protons, the Booster should be able to store the protons at 200 MeV for several seconds. We expect that the Booster will increase the AGS proton intensity by a factor of four, polarized proton intensity by a factor of twenty to thirty, and will also enable the AGS to accelerate all species of heavy ions (at present the AGS heavy ion program is limited to the elements lighter than sulfur because it can only accelerate fully stripped ions). The construction project started in FY 1985 and is expected to be completed in 1989. The purpose of this paper is to provide a future reference for the AGS Booster lattice.

44 INSTRUMENTATION

4401 Radiation Instrumentation

REFER ALSO TO CITATION(S) 32452, 33273, 33368, 33481, 33863, 33902, 33903, 33904, 33905, 33906, 33907, 33908, 33909, 33910, 33911, 33912, 33913, 33914, 34084, 34156, 34218, 34219, 34332

33511 **(DOE/ER/40048—194) Early expectations of AMS: Greater ages and tiny fractions: One failure? One success.** Schmidt, F.H.; Balsley, D.R.; Leach, D.D. (Washington Univ., Seattle (USA). Nuclear Physics Lab.). 1987. Contract AC06-81ER40048. 13p. (CONF-8704112—3). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009710.

From 4. international symposium on accelerator mass spectrometry; Ontario, Canada (27 Apr 1987).

Two of the early expectations of Accelerator Mass Spectroscopy were extension to greater ^{14}C ages than possible with beta counting, and applications using tiny amount of carbon. We examine each in the light of our experiences. Although ^{14}N ions are generated spontaneously and copiously in our FN tandem accelerator, the system per se is capable of age determinations as great as 90,000 years. However, ^{14}C contamination, apparently introduced principally during the chemical steps of sample preparation, imposes a limit of about 50,000 years. In this respect AMS is a mixed success. However, application to small fractions is a well-known success. We have applied this advantage to the study of the organic carbon components present in the Amazon River and in deep sea cores. 10 refs., 3 figs., 1 tab.

33512 **(DOE/OR/00033—T302) An algorithm for unfolding neutron dose and dose equivalent from digitized recoil-particle tracks.** Bolch, W.E. (Florida Univ., Gainesville (USA)). Aug 1986. Contract AC05-76OR00033. 118p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE87009216.

Previous work conducted at the Oak Ridge National Laboratory (ORNL) has demonstrated the feasibility of a digital approach to neutron dosimetry. In contrast to current analog methods, the digital approach specifically refers to methods of collection and processing of ionization products created by recoil particles within detector volumes. A dosimeter utilizing the digital approach would consist of both a detector and a computer algorithm. The detector would measure the integral number of subexcitation electrons produced by recoil particles within various subvolumes of its sensitive volume. The computer algorithm would unfold the quantities absorbed dose, linear energy transfer, and dose equivalent given that digital track-structure information. ORNL researchers have completed a Monte Carlo simulation code of one detector design utilizing the operating principles of time-projection chambers. This thesis presents and verifies one version of the dosimeter's computer algorithm. This algorithm processes the output of the ORNL simulation code, but is applicable to all detectors capable of digitizing recoil-particle tracks. Key features include direct measurement of track lengths and identification of particle type for each registered event. The resulting dosimeter should allow more accurate determi-

nations of neutron dose and dose equivalent compared with conventional dosimeters, which cannot measure these quantities directly. Verification of the algorithm was accomplished by running a variety of recoil particles through the simulated detector volume and comparing the resulting absorbed dose and dose equivalent to those unfolded by the algorithm.

33513 **(EGG—10282-2155) High resolution scintillation spectroscopy with HgI_2 as the photodetector.** Markakis, J.M. (EG and G Energy Measurements, Inc., Goleta, CA (USA). Santa Barbara Operations). [1987]. Contract AC08-83NV10282. 19p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009283.

This report details the progress made in developing mercuric iodide photocells - in particular as the photodetector in scintillation spectrometers where photomultipliers are conventionally used. A spectrometer consisting of an HgI_2 photocell optically coupled with a CsI(Tl) scintillator gave a ^{137}Cs (662 keV) resolution of 5.33% FWHM, the best ^{137}Cs resolution reported to date using a scintillation spectrometer. Relative to photomultiplier tubes, solid state photodetectors are smaller, insensitive to magnetic fields, and have higher quantum efficiencies. HgI_2 photocells offer an unprecedented energy resolution for scintillation spectrometers and push closer to the resolution of scintillation crystals themselves.

33514 **(FRNC-TH—2318) Statistical analysis of non-homogeneous Poisson processes. Statistical processing of a particle multidetector.** Lacombe, J.P. (Grenoble-1 Univ., 38 (France)). Dec 1985. 138p. (In French). NTIS (US Sales Only), PC A07/MF A01. File Number DE87751834.

Statistic study of Poisson non-homogeneous and spatial processes is the first part of this thesis. A Neyman-Pearson type test is defined concerning the intensity measurement of these processes. Conditions are given for which consistency of the test is assured, and others giving the asymptotic normality of the test statistics. Then some techniques of statistic processing of Poisson fields and their applications to a particle multidetector study are given. Quality tests of the device are proposed togetherwith signal extraction methods.

33515 **(IAEA-TECDOC—402) Personnel radiation dosimetry. Proceedings of a technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters held in Vienna, 22-26 April 1985.** (International Atomic Energy Agency, Vienna (Austria)). Jan 1987. 245p. (CONF-8504302—). NTIS (US Sales Only), PC A11/MF A01. File Number DE87702284.

From Technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters; Vienna, Austria (22 Apr 1985).

The book contains the 21 technical papers presented at the Technical Committee Meeting to Elaborate Procedures and Data for the Intercomparison of Personnel Dosimeters organized by the IAEA on 22-26 April 1985. A separate abstract was prepared for each of these papers. A list of areas in which additional research and development work is needed and recommendations for an IAEA-sponsored intercomparison program on personnel dosimetry is also included.

33516 (IAEA-TECDOC—402, pp 161-170) **Reference neutron fields to test dosimetry system detectors at nuclear and physics facilities.** Britvich, G.I.; Krupny, G.I.; Lebedev, V.N.; Rastzvetalov, Y.N. (Institute for High Energy Physics, Serpukhov, USSR). Jan 1987. NTIS (US Sales Only), PC A11/MF A01. File Number DE87702284. (CONF-8504302—).

From Technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters; Vienna, Austria (22 Apr 1985).

Neutron dosimeters were tested in typical neutron spectra behind the shielding of accelerators and reactors. It was concluded that the conditions for an "ideal" dosimeter can be satisfied to an accuracy of 40% in the specified class of spectra. 16 references, 7 figures, 1 table.

33517 (IAEA-TECDOC—402, pp 171-181) **Personnel neutron and gamma-ray dosimeter intercomparison studies at Oak Ridge National Laboratory.** Sims, C.S. (Oak Ridge National Lab., TN). Jan 1987. NTIS (US Sales Only), PC A11/MF A01. File Number DE87702284. (CONF-8504302—).

From Technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters; Vienna, Austria (22 Apr 1985).

Ninety-five different organizations (64-USA, 31-Other Nations) have participated in ten annual personnel dosimetry intercomparison studies conducted at ORNL since 1974. The well-characterized Health Physics Research Reactor has been operated on 61 occasions during these studies to provide dose equivalents to about 7000 dosimeters with a variety of radiation spectra ranging from a relatively hard, unmoderated fission spectrum to a relatively soft spectrum obtained by moderating fission neutrons by Lucite and concrete. Five basic types of neutron dosimeters (TLD, TLD albedo, track, film, combination) and two basic types of gamma-ray dosimeters (TLD, film) have been used to make over 98% of the measurements. The performance of these dosimeters is compared with accepted standards and guidelines. Conclusions relative to the application of various types of personnel dosimeters are presented. 10 references, 7 figures, 2 tables.

33518 (IAEA-TECDOC—402, pp 183-188) **New personnel dosimeter performance test programs in the United States.** Sims, C.S. (Oak Ridge National Lab., TN). Jan 1987. NTIS (US Sales Only), PC A11/MF A01. File Number DE87702284. (CONF-8504302—).

From Technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters; Vienna, Austria (22 Apr 1985).

Two new, government-initiated personnel radiation dosimeter performance test programs are underway in the United States. The National Voluntary Laboratory Accreditation Program (NVLAP) is out of the pilot state and, since January of 1984, has been involved in testing and evaluation leading to the certification of dosimeter processors. The Department of Energy Laboratory Accreditation Program (DOELAP) entered the pilot program stage in February of 1985. The technical basis for and description of the NVLAP are found in ANSI N13.11 (1983), Criteria for Testing Personnel Dosimeter Performance. For DOELAP, similar information is found in PNL-4515 (1984), Guidelines for the Calibration of Personnel Dosimeters. Information relating to the development of the programs, radiation test categories, details associated with the irradiations, NVLAP test results to date, DOELAP testing status, and future prospects for both programs are presented and discussed. 7 references, 4 tables.

33519 (IAEA-TECDOC—402, pp 189-196) **TLD-Personnel monitoring system at the Boris Kidric Institute of Nuclear Sciences-Vinca and a review of current status of personnel dosimetry in Yugoslavia.** Prokic, M. (Institut za Nuklearne Nauke Boris Kidric, Belgrade, Yugoslavia). Jan 1987. NTIS (US Sales Only), PC A11/MF A01. File Number DE87702284. (CONF-8504302—).

From Technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters; Vienna, Austria (22 Apr 1985).

About 16,500 radiation workers are currently supervised with personnel dosimeters in Yugoslavia by seven operative authorized personnel monitoring services. Since 1977 the equality of using thermoluminescence and film dosimeters is legally prescribed. At the beginning of 1978, the first authorized institution was the Boris Kidric Institute of Nuclear Sciences, Vinca which introduced thermoluminescence dosimetry as the main dosimetry technique in personnel monitoring service. The organization of the TLD personnel monitoring system at the Boris Kidric Institute of Nuclear Sciences, Vinca which is based on MgB_4O_7:Dy solid TLD developed and produced by the Institute is presented. The layout and the operation details also of the automated and computerized TLD personnel monitoring system in the Institute, performances of the dosimetric system and evaluation procedures, are discussed. The paper also presents the organization of the personnel dosimetry in Yugoslavia and gives a review of the current status, assessments and

trends in personnel dosimetry in Yugoslavia. Some proposals for additional research and subjects for future international intercomparison programm on personnel dosimetry are presented and discussed. 3 references, 1 figure.

33520 (IAEA-TECDOC—402, pp 207-219) **Radiation protection dosemeter intercomparison programme of the CEC.** Seguin, H. (Commission of the European Communities, Luxembourg). Jan 1987. NTIS (US Sales Only), PC A11/MF A01. File Number DE87702284. (CONF-8504302—).

From Technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters; Vienna, Austria (22 Apr 1985).

We review comparative studies on radiation protection dosemeters carried out since 1986 by the competent national institutes and the Commission of the European Communities; the results of these studies are illustrated by means of examples. 10 references, 11 figures, 3 tables.

33521 **(IFVE-OEF—86-6) Improvement of electron-hadron discrimination in electromagnetic layered calorimeters.** Kryshkin, V.I.; Ronzhin, A.I. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1986. 10p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702287.

Submitted to the journal NIM.

A method for the improvement of electron and hadron discrimination in layered calorimeters at the level of fast trigger is suggested. The method consists in optical filter installation between light guides extracting light from each separate layer and photodetector (or between layered medium and re-emitter in sandwich-type calorimeters). The filter transparency is proportional to electromagnetic shower intensity over the calorimeter depth. 40 lead plates alternating with 40 plates of polystyrene scintillator are used as a layered medium. Dimensions of the lead plates are 50x50x3 mm, those of scintillation ones - 50x50x4 mm. The application of the method suggested using conventional photomultipliers results in a 3-7 times increase in the level of hadron and electron discrimination (with energies in the range 6-26 GeV) for 30 ns. When position-sensitive photode tectors are used the modulus can be important for the study of cascade curve shapes. 7 references, 4 figures.

33522 **(IFVE-OEF—86-14) Characteristics of scintillation and spectrum-shifting fibers.** Alekseeva, E.I.; Gorin, A.M.; Zajchenko, A.A.; Lapshin, V.G.; Rykalin, V.I.; Dyachenko, A.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1986. 16p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702288.

Characteristics of optical scintillation and spectrum-shifting fibers with a polystyrene (PS) or organic solvent core are considered. Scintillation PS fiber core light output constitutes 80-85% relative to NE110 scintillator, typical attenuation length for using as an organic silicone cladding with 2-4 mm fiber diameter is 80-120 cm. Light output of quartz capillars filled with scintillating solution based on 1-methylnaphthaline is about 100-110% relative to NE 110. Typical attenuation length for core diameter 0.2-0.25 mm amounts to 60 cm for scintillators and 150 cm - for spectrum mixers. Characteristics of scintillation rods designed for scintillation hodoscopes are considered as well. 18 references, 4 figures, 5 tables.

33523 **(IFVE-OEF—86-65) Manipulator with program control for tuning voltage in multichannel detector counters.** Belikov, N.I.; In'shakov, V.I.; Kulikova, L.I. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1986. 6p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702289.

Submitted to the journal Instrum. Exp. Tech.

A manipulator for automatic and accurate control of high voltage of the Cherenkov spectrometer counters of total absorption with 800 channels is described. The manipulator is equipped by the program control system and operates on line with the HP-2100 A computer. The operations are executed in succession and on the average it is spent 5s for each counter. More than two years the manipulator has been used for ChSPP-800 gamma detector of the PROZA set-up. It has high reliability - during the abovementioned period there is no failure with any manipulator unit. 7 references, 1 figure.

33524 **(IFVE-OEF—86-128) Investigation of some gaseous mixture electroluminescence and methods of wire chamber optical readout.** Polyakov, V.A.; Rykalin, V.I.; Tskhadadze, Eh.G. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1986. 10p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702290.

Submitted to the journal Instrum. Exp. Tech.

Luminescence in the proportional and the self-quenching streamer (SQS) regime has been studied. Emission spectra, light yield factors and gas gain coefficients are measured. The highest light yield obtained for the gas mixtures Ar + aceton + white spirit is $2x10^7$ photons in the proportional regime and $1.1x10^7$ photons in the SQS regime. Three methods of the wire-chamber optical readout have been tested. The best results have been obtained with the wavelength shifter strips and fibres placed behind the chamber cathode planes. 23 references, 5 figures, 2 tables.

33525 (INIS-mf—10889, pp 34) **Detection of low- and high-LET radiation with alanine.** Hansen, J.W. (Risoe National Lab., Roskilde, Denmark). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33526 (INIS-mf—10889, pp 38) **Film-dosimeter-system for high dose dosimetry of ionizing radiation.** Ihme, B.; Dorschner, H.; Heger, A.; Plaschnick, D.; Knabe, K. (VEB Filmfabrik Wolfen, Fotochemisches Kombinat ORWO, Wolfen, German Democratic Republic). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33527 (INIS-mf—10889, pp 60) **Dosimetry for radiation processing.** Miller, A. (Risoe National Lab., Roskilde, Denmark). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33528 (INIS-mf—10889, pp 64) **High-dose dosimetry in massive radiation processing with 10-13 MeV electron beam.** Panta, P.P. (Institute of Nuclear Chemistry and Technology, Warsaw, Poland). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33529 (INIS-mf—10889, pp 65) **Use of silicon diodes for gamma dose measurements.** Pesek, M.; Kits, J.; Obraz, O.; Sopko, B.; Skubal, A. (Ustav pro Vyzkum, Vyrobu a Vyuziti Radioisotopu, Prague, Czechoslovakia; Ceske Vysoke Uceni Technicke, Prague, Czechoslovakia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33530 **(INIS-mf—10910) Airborne radon measurement.** Dvorak, V.; Vasek, T.; Bendl, J.; Merinsky, J.; Frystacka, L. (Tesla, Premysleni (Czechoslovakia). Vyzkumny Ustav Pristroju Jaderne Techniky). May 1986. 37p. (In Czech). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702302.

A scintillation detector is proposed for measuring radon in the atmosphere. It has the shape of a chamber with a volume of ca

750 ml and a detection efficiency of ca 58%. The walls are covered with a ZnS phosphor and the whole chamber may be connected to the body of a scintillation detector unit with a photomultiplier. Six different types were designed and their suitability, production and material exactingness and applicability is discussed. Theoretical and experimental data are given on the monitor for the concentration of the potential energy of alpha radiation of radon daughters. The given results allow to establish a new concept of such an instrument for environmental monitoring. (M.D.).

33531 **(ITEF—45(1986)) PRET-3 modified special processor for track element recognition.** Il'kov, L.V.; Krupnov, V.E.; Chernov, A.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). 1986. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702310.

PRET and its modified variation PRET-3 are special processor for track element recognition operating simultaneously with a universal computer. They are designed for primary data processing on two-dimensional image obtained from a track chamber. Device modification is aimed at: a) increasing PRET effective speed; b) reducing time for data preparation performed by computer software; c) bringing up to date and development of PRET logic structure (simplification of data structure, provision with great resourcefulness under different operating conditions of the device). Modification extends the sphere of PRET-3 application. First of all it relates to on-line experiment processing. Improvement of PRET-3 structural organization permits to save in every scanning line upto 7 references to computer storage. 3 references, 6 figures.

33532 **(ITEF—75(1986)) Transition radiation detector for pions and electrons discrimination.** Artamonov, A.A.; Gorbunov, P.A.; Grigor'ev, E.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). 1986. 35p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702314.

Performances of transition X radiation (TXR) detector with radiators of different materials in electron and pion beams in the 1-5 GeV/c pulse range are studied. It is shown that the method for determination of total power release permits to attain better e/π-separation than the method of cluster separation. Experimental data well agree with the calculations in the shape of TXR spectrum, but absolute quantum yield is less than the expected one by 30%. The coefficient of e/π-separation 200 at efficiency of electron detection equal to 0.90 is obtained in the detector comprising 6 moduli and having beam dimension of 80 cm. Problems of optimization of TXR detector form are discussed. 9 references.

33533 **(ITEF—104(1986)) Use of krypton-methane mixtures in emission detectors with gas amplification.** Anisimov, S.N.; Bolozdynya, A.I.; Egorov, V.V.; Stekhanov, V.N. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). 1986. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702316.

It was experimentally shown that emitted from liquid krypton electrons are detectable by multiplication near the 20 μm gold plated volfram wires in a krypton-method gas mixtures. In this the multiplication factor is equal 500 in $Kr+39\%CH_4$ gas mixture. Emission electric field threshold of a liquid krypton-methane mixture is greater then that of liquid krypton (in 6, 4 times at 12% molar concentration of methane at 120 K). 6 references, 4 figures.

33534 **(JINR—13-86-327) Mini-drift chamber with 4 mm gap. Bench-scale testing.** Davydov, Yu.I.; Strmen', P.; Feshchenko, A.A.; Flyagin, V.B.; Chirikov-Zorin, I.E.; Spalek, J. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1986. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702326.

Characteristics of the drift chamber with 4 mm drift gap combining simplicity of construction and rapidity of a proportional chamber with high-accuracy of a usual drift chamber were inestigated using a β-source. Measurements have been made with argon-isobutane gas mixture (70% Ar+30% C_4H_{10}). The chamber had good linearity of the drift characteristics. By estimation, the region of non-linearity of drift characteristic near the potential wire is approximately 0.5-0.6 mm. This is due to both drift velocity decrease in this region and electron drift way increase. Simulation of the electric field in the drift cell has been conducted, possibility of optimizing the geometry of chamber electrodes for decrease of the non-linearity region is discussed. 7 references, 9 figures.

33535 **(JINR—13-86-445) Proportional chamber with 1 mm anode wire spacing.** Balandin, V.P.; Gus'kov, B.N.; Veres, I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1986. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702327.

Submitted to the journal Prib. Tekh. Ehksp.

The structures of three-coordinate proportional chambers with working areas of 256x256 mm and signal wire spacing of 1 and 2 mm are described. Their main characteristics are given. On the base of test results the magic gas mixture containing $Ar+20\%C_4H_{10}+2\%C_3H_8O_2+0.3\%CF_3Br$ is chosen as a working substance. The efficiency of charged particle detection is 99%. The length of the plateau is 750 V and 1000 V, the space resolution is 0.318 mm and 0.67 mm for the chambers with anode wire spacing of 1 and 2 mm respectively. 9 references, 5 figures.

33536 (JINR—D-13-85-793, pp 12-19) **ESONE committee activities on developing new standards of nuclear electronics.** Trekhtsinski, R. (Institute of Nuclear Research, Warsaw, Poland). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

Main factors promoting development of electronic modular systems and hardware grounds for them are considered. The ESONE committe is occupied with the development of the VME BUS (16-bit system, the dimension of the printed circuit is 6U x 160 mm the dataway hardcopy log is asynchronous) and MULTIBUS 2 (32-bit system, the dimension of printed circuit is 6U x 220 mm, dataway hardcopy log is synchronous, MIC and BAC are special microcircuits) and participates in the development of the FASTBUS system. Computer aided design, development of portable software, personal computers and intelligent work stations and local area computer networks belong to other important directions of activity of the ESONE committee.

33537 (JINR—D-13-85-793, pp 20-29) **FASTBUS standard, hardware and software.** Rimmer, E.M. (European Organization for Nuclear Research, Geneva, Switzerland). 1985. NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

The structure and basic operations of the FASTBUS system which have been jointly specified by the NIM (Nuclear Instrument Modules) and ESONE (European Standards on Nuclear Electronics) Committees are considered. FASTBUS is a standard parallel bus system for high-speed, large-scale data acquisition and processing. It is built of backplane crate segments joined by cable segments. Segment arbitration allows multiprocessing, its autonomy allows parallel processing. Uniform system-wide hand-shaked bus protocols ensure reliability and accomodate both high- and low-speed devices. A sunchronous mode provides for data block transfers at maximum speed. The FASTBUS system meets the needs of high-energy physicists and matches the technologies of the next generation of experiments.

33538 (JINR—D-13-85-793, pp 36-45) **Status and prospects of the FASTBUS system application.** Govorun, V.N. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

Design peculiarities of the FASTBUS electronic system are discussed. Development of the system begun in 1977 is practically finished. The stage of testing pilot and prototype systems on the basis of the FASTBUS system passed successfully. The system displayed fine serviceability and now it is effectively used in physical experiments. Industries of the Western Europe, USA and Japan run in and manufacture the necessary components and main set of moduli of the FASTBUS system. By late 80-es it is supposed to put into operation more than 10 large physical facilities with data acquisions and processing systems on the base of the FASTBUS system with the total number of highways of the order of 10/sup 6/.

33539 (JINR—D-13-85-793, pp 49-52) **Development of unified equpment interfaces operating acording to the CAMAK-COMPEX protocol.** Basiladze, S.G.; Stepanov, A.N.; Suvorov, V.V.; Rybnikov, V.M. (Moskovskij Gosudarstvennyj Univ., USSR). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

Interfaces intended for assurance of flexible connections in multiprocessor multicrate systems for nuclear-physical investigations realized in the CAMAC-COMPLEX hardcopy log are considered.

33540 (JINR—D-13-85-793, pp 58-63) **Applicability of serial multi-master bus systems to scientific instrumentation.** Meiling, W.; Krause, R. (Technische Univ., Dresden, German Democratic Republic. Sektion Physik). 1985. NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

The problem of applicability of serial multi-master Bus systems in modular measuring systems are discussed. The typical configuration of Serial CAMAC Highway is shown. In maximum 62 crates can be connected within the loop the clock frequency of which can reach 5 MHz. Remarkable improvement of performance is obtained when multiple controllers are used in CAMAC crates basing on the CAMAC highway extension with the Auxiliary Controller Bus.

33541 (JINR—D-13-85-793, pp 89-93) **Nuclear research automation development in the Institute of Nuclear Researches of AN Ukrainian SSR.** Ofengenden, R.G. (AN Ukrainskoj SSR, Kiev. Inst. Yadernykh Issledovanij). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

A system for collective use developed in the Institute of Nuclear Researches of AN Ukrainian SSR and applied to carry out experiments on the U-240 isochronous cyclotron, the U-120 cyclotron, a nuclear reactor and an electrostatic generator is described. The system comprises 4 similar on-line problem-oriented laboratories (APOL) and analog equipment connected with each of them. The APOL represents a set of hardware and software means intended for acquisition, accumulation and preliminary processing digital data as well as for call-reply between experiment and facility. The APOL includes the IVK-2 on-line measurement complex containing the SM-4 computer and 2 CAMAC crates. The RAFOS operating system is used in the APOL.

33542 (JINR—D-13-85-793, pp 115-122) **Conceptions of development and design of on-line systems for scientific researches.** Matalin-Slutskij, L.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

Basic requirements, principles of development, software and hardware of on-line systems for scientific investigations (ASSI) are considered. Despite differences in objects of investigations the requirements to ASSI are practically the same and they are reduced mainly, to the following: high reliability (approximately 1000 h of failure-free performance); high speed of response (about 1 s); capability for acquisition, processing, exchange between users and filing of large stream of data (up to dozens Lbyte) possibility of real-time operation; flexibility of operation, permitting to replace some units and change in the structure of the system, high operating characteristics (resolution, small error, noise protection); collective service of dozens and hundreds of independent users; simplicity of operation. A unified approach was used in development of software and equipment of ASSI.

33543 (JINR—D-13-85-793, pp 132-135) **Use of 16-digit microcomputer with Q bus in the Laboratory of Nuclear Problems of JINR.** Vu Chung Kh'eu; Sinaev, A.N.; Somov, L.N.; Churin, I.N. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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Main parameters of 16-digit the "Elecktronika-60", the DVK, the "Mera-60" and the KM002 microcomputers used for control of the CAMAC electronic equipment constituting a part of experimental facilities in the Laboratory of Nuclear problems of JINR are considered. The microcomputers have Q buses of processors and a system of commands similar to the SM computer. It permits to utilize unified interface moduli and software including the widely used RAFOS (RT-2) system and applied programs. Automated benches of detection equipment, for example, multiwire chambers and multichannel hodoscopic systems are developed on the base of the considered microcomputers. Several microcomputers are connected to the terminal network of the SDS 6500, the ES-1060 ad the BESM-6 main computers as intellectual terminals.

33544 (JINR—D-13-85-793, pp 136-138) **Terminal network of the JINR High-Energy Laboratory.** Bazylev, S.N.; Slepnev, V.M.; Shtrajt, Eh. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

The structure of terminal network of the "MISKA" CAMAC microprocessor system for processing physical experiment data and solution of mathematical problems is considered. The system comprises an interface of the ES computer multiplex channel IMKES 586 connected with the terminal control device ES 7922 M and a microprocessor device for terminal control. Operation of the considered terminal network revealed their perfect workability and reliability at 18 simultaneously operating users.

33545 (JINR—D-13-85-793, pp 139-142) **Organization of data acquisition system on base of the EhLEKTRONIKA-60 microcomputer, operating on-line with the ES computer.** Bazylev, S.N.; Smirnov, V.A. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

A complex of equipment for parallel data acquisition from several experimental facilities operating on-line with the ES computer is described. The "ELEKTRONIKA-60" microcomputer with the mass memory of 56 K bytes is used as a buffer computer. The byte-transfer rate can approach 800 K byte/s.

33546 (JINR—D-13-85-793, pp 155-158) **Distributed-intelligence system for physical experiment automation.** Markovski, Ya.; Piontkovski, A.; Kositska, M. (Warsaw Univ., Poland). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

A set of CAMAC units is considered; the set can be used for development of a measuring system for nuclear physics and medical technique. The considered equipment is utilized for experiment control and data accumulation in the system including the SM-4A cen-

tral computer and several the SM-1300 peripheral computers, which is developed in the section of nuclear and medical electronics of the Warsaw Technical University. The system ensures instrumentation operation, optimization of transmission band of spectrometric channels when detecting weak signals and measurement of Moessbauer effect, nuclear radiations and Compton effect, fluorescent and activation analysis as well as processing the results of measurements of arbitrary signals.

33547 (JINR—D-13-85-793, pp 176-180) **Microcomputers and control modules on the base of the K1810 microprocessors.** Govorun, V.N.; Ermolin, Yu.V.; Mamakov, P.V.; Rybakov, V.G.; Sytin, A.N.; Kholodenko, G.M.; Gorbunov, N.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij; Joint Inst. for Nuclear Research, Dubna, USSR). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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Main parameters of a microcomputer of supplementary crate controller and the data way branch driver constructed on the base of 16-digit microprocessor set of the K1810 series (analog-Intel-8086) are presented. Microcomputers can operate autonomously or it can be combined with an auxiliary controller or branch driver organizing corresponding intellectual devices. The moduli are designed in the CAMAC and SUMMA standards. The microcomputer comprises a processor, a nemory device of 16 K byte capacity, input-output devices, interrupt controller, controller of direct access to memory and address decoder of external devices. The considered moduli permit to develop multicrate systems with microcomputer control and systems with distributed control used in experiments on high-energy physics. It is supposed to develop additionally 512 byte memory module to extend fields of their application. Besides, it is supposed to develop interface for comunication of the microcomputer with a flexible magnetic disk accumulator.

33548 (JINR—D-13-85-793, pp 181-183) **Intelligent crate controller on the base of the K1801 microprocessors.** Dantsevich, G.A.; Sytin, A.N. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

The AKK-196 crate controller on the base of 16-digit single-crystal microprocessor (microcircuit K 1801 VM1) is described. The systems developed with the use of the described controller can operate both autonomously and as a part of larger systems, as intellectual units used in high energy physics experiments.

33549 (JINR—D-13-85-793, pp 184-188) **Additional controller and program loading unit for operation with DVK-1.** Mamakov, P.V.; Rybakov, V.G.; Samatov, G.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

An additional controller and a program loading unit intended for operation with the DVL-1 conversational computer complex are described. The DVK-1 comprises the "Elektronika NMS 11100.1" microcomputer and a display. The considered electronic moduli permit to use the DVK-1 for construction of small single-crate systems applied for investigation and tuning of electronic equipment. The system is developed on the base of the DEC-10 computer and is utilized for check-out of the control system of correction source for the IHEP ring injector-booster field.

33550 (JINR—D-13-85-793, pp 189-193) **Use of the CAMAC-MULTIBUS combined protocol for organizing multi-processor operation in a crate.** Glejbman, Eh.M. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

Problems of developing electronic units for large on-line systems for nuclear-physical experiments automation and developed on the base of principles of distributed control and data processing are discussed. Crates with simultaneous disposition and operation of CAMAC moduli (EUR-4100) and those realizing the MULTIBUS hardcopy log in dataway are described. It is attained due to sharing the CAMAC and the MULTIBUS hardcopy logs in the crate dataway. Application of job scheduler and executor moduli in the MULTIBUS interface permits to organize multiprocessor operation and to obtain separation of data stream as well as to increase total computational capacity in the crate.

33551 (JINR—D-13-85-793, pp 199-201) **PS-80 autonomous programmed system on the base of a microprocessors.** Pleshko, M.; Yanik, R. (Komenskeho Univ., Bratislava, Czechoslovakia). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

The PS-80 autononous programmed system developed on the base of a single-printed circuit microcomputer which permits to connect different inlet and outlet devices due to application of large integral circuits is described. The microcomputer has fixed memory of 2 kbyte and mass memory of 4 kbyte. The system is disposed in the CAMAC module and it is used for outomatic data acquisition and processing when measuring low levels of radioactivity.

33552 (JINR—D-13-85-793, pp 214-217) **Monolithic integrated circuit for the strobed charge-to-time converter.** Bel'skij, V.I.; Bushnin, Yu.B.; Zimin, S.A.; Punzhin, Yu.N.; Sen'ko, V.A.; Soldatov, M.M.; Tokarchuk, V.P. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

The developed and comercially produced semiconducting circuit - gating charge-to-time converter KR1101PD1 is described. The considered integrated circuit is a short pulse charge-to-time converter with integration of input current. The circuit is designed for construction of time-to-pulse analog-to-digital converters utilized in multichannel detection systems when studying complex topology processes. Input resistance of the circuit is 0.1 Ω permissible input current is 50 mA, maximum measured charge is 300-1000 pC.

33553 (JINR—D-13-85-793, pp 218-222) **Autonomous CAMAC analyzer with control the EhLEKTRONIKA-60 type computer.** Georgiev, A.; Zhuravlev, N.I.; Nedelchev, N.; Salamatin, A.V.; Sinaev, A.N. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

The MAK-2 CAMAC amplitude analyzer for spectrum observation and experimental data input into the computer memory is described. The basic analyzer set comprises 4 blocks: the KA007 analog-to-digital converter, block of increment record the KL018, the KL020 memory and interface of graphic display KI038. A program package written in Macroassembler and Fortran 4 languages is developed for analyzer operation under the "ELECTRONIKA-60" microcomputer control. Data accumulation and observation of the recorded spectrum are carried out using auxiliary interblock buses avoiding the crate dataway that can increase the accumulation and observation procedures and makes it possible to dispose several analyzers and other moduli in one crate.

33554 (JINR—D-13-85-793, pp 223-227) **CAMAC amplitude analyzer with improved loading ability.** Ivanov, V.V.; Kadashevich, V.I.; Marchenko, V.V.; Tubol'tsev, Yu.V.; Yurchenko, K.G. (AN SSSR, Leningrad. Inst. Yadernoj Fiziki). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

An amplitude analyzer on the base of the autonomous controller intended for analog and analog-to-digital processing of signals from semiconducting detectors is described. Analog signal processing is carried out by a processor with time-dependent parameters constructed on the base of two CAMAC moduli. The first module represents an amplifier with the gain factor from 2 to 10/ sup 3/. The second module is a multifunctional device including controlled reshaper and shaping filter, an inspector of overlappings, an amplitude-time converter as well as the control circuit and the intermodulus exchange of logic signals. Software permits to present data in linear and logarithmic scale, to determine peak duration at the levels of 0.1 and 0.5 as well as the position of their center of gravity and square with deduction of background.

33555 (JINR—D-13-85-793, pp 233-236) **Low-cost multichannel pulse-height analyzer PHA 256 using single-chip microcomputer.** Koehler, M.; Meiling, W. (Technische Univ., Dresden, German Democratic Republic. Sektion Physik). 1985. NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

The PHA 256 multichannel analyzer on the base of the U8820 single-chip microcomputer applied for radiation measurements, for example in monitoring systems with scintillation detectors, is described. The analyzer contains a power supply unit and 7 boards, namely, the processor board; data and program memory; 8-bit analog-to-digital converter; driver to display device; keyboard with 23 function keys; pulse amplifier and high-voltage supply (up to 2 kV). Software used provides preprocessing of spectra supported by following functions: addition and subtraction of different spectra, spectrum monitoring by use of a 5-point-algorithm, calculation of peak areas with linearly interpolated background.

33556 (JINR—D-13-85-793, pp 240-244) **Fast-response processor for data selection and processing in a multichannel analog-to-digital converter.** Zamrij, V.N. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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A multichannel analog-to-digital converter representing the base of the fast channel of the system for multiplex measurement of amplitudes and timing parameters is described. The fast-response processor switched into the measuring channel is intended for data selection by predetermined criteria and on-line processing and compression of the recorded data.

33557 (JINR—D-13-85-793, pp 418-419) **Interface for the RTF 20026 one-channel analyzers.** Kollar, D. (Komenskeho Univ., Bratislava, Czechoslovakia). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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An interface permitting to use the PMD-85 personal microcomputers ad the PMI-80 single-circuit microcomputers in combination with the RFT-20026 one-channel analyzers for data readont and processing as well as control of physical experiment when training students is suggested. The RFT-20026 analyzer contains a high-voltage source, a spectrometric amplifier, integrated and differential discriminators, a timer and a display. Different types of detectors: semiconducting, scintillation, proportional, can be connected to the analyzer depending on certain requirements of the experiment.

33558 (JINR—D-13-85-793, pp 428-430) **Measuring module for standard measurements on the base of the MERA-60 type computers and CAMAC equipment.** Baluka, G.; Ermakov, V.A.; Zhukov, G.P.; Zimin, G.N.; Poplova, A.I.; Popov, A.B.; Salamatin, I.M.; Samosvat, G.S.; Shirokov, V.K. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

A system for experiment automation applicable without additional programming for the use under different conditions is described. CAMAC analog-to-digital converter, memory unit for spectrum accumulation in the regime of direct access, the unit of four KS-004 counters, the 12-digit relay register for facility control, the display and the MERA-60 computer are used in the system. Software of the system is realized in the PASCAL language in the RT-11 operating system. The system is under operation since 1983.

33559 (JINR—D-13-85-793, pp 64-70) **Electronic equipment and systems for experiment automation in the JINR Laboratory of Neutron Physics.** Zhukov, G.P. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

Peculiarities of studies conducted in neutron beams of the IBR-2 and IBR-10 reactors are discussed. The used types of radiation detectors, parameters of measuring moduli, particularly, measuring module of a small-angle scattering spectrometer as well as the structure of a measuring center and local computer network are considered. Semiconducting Ge(Li)-, Si(Li)- and Si surface-barrier detectors, multisectional ionization proportional chambers, multiwire proportional position-sensitive detectors and single-coordinate position-sensitive detectors with a high-ohmic anode are used as detectors. One- and two-computer as well as multiprocessor measuring moduli are utilized. The measuring center represents a multicomputer radial structure system. The PDP-11/70 computer realizes functions of the central computer. The local computer network is built based on the ETHERNET type monochannel.

33560 (JINR—D-13-85-793, pp 71-78) **Electronic equipment for atomic nucleus structure studying.** Brudanin, V.B.; Vasilev, D.; Vylov, Ts.; Zhuravlev, N.I.; Salamatin, A.V.; Sidorov, V.T.; Sinaev, A.N.; Churin, I.N. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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The CAMAC electronic equipment used in data acquisition systems for spectrometers intended for investigation of the structure of an atomic nucleus is considered. Specific features of electronic units forming a part of spectrometers for determination of neutrino helicity and three-dimensional amplitude-time measurements as well as electrostatic beta-spectrometer are discussed. Parameters of the MAK-1, the MAK-2 and the MAK-3 multichannel amplitude analyzers developed specially for these spectrometers are given. Accumulation of data coming from analog-to-digital converters and output of recorded spectra on the screens of displays is realized without use of the crate dataway that permits to avoid time losses and to place several analyzers in a crate. Observation of spectra is realized simultaneously with their registration.

33561 (JINR—D-13-85-793, pp 79-88) **Automation of experiments in heavy ion physics.** Fefilov, B.V. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

Specifications of electronic equipment which is a part of experimental installations used for nuclear-physical in-beam studies on high-energy accelerators are presented. The equipment for data acquisition, selection and numeral is placed in the accelerator room. It results in the necessity of using computer-controlled not only digital but also analog and timing CAMAC moduli including coincidences circuits and logics of selection. Functions of data acquisition and selection of events as well as data transmission are carried out by built-in microprocessors. They also permit to exercise control of characteristics of CAMAC moduli, testing dataways of computer-controlled generators and calibration sources as well as monitoring of detector parameters. The detection part of electronics represents a multiprocessor system controlled by the central computer. Appearance of new 32-digit microprocessors in combination with the requirement of developing multimicroprocessor systems states the problem of changing in the nearest future the CAMAC standard for more perfect ones, for example MULTIBUS-2.

33562 (JINR—D-13-85-793, pp 151-154) **Hard- and software for realization of two-computer measuring complex on the base of SM-(SM4) and MERA-60.** Alfimenkov, A.V.; Vagov, V.A.; Korobchenko, M.L.; Ostrovnoj, A.I. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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The procedure of data transmission in a measuring system comprising the SM3(SM4) computer located in the measuring center (MC) and the MERA-60 microcomputer placed in the experimental room of the IBR-2 reactor is considered. Data exchange between computers is realized by two sequential duplex communication channels by means of four special programs, the basic characteristics of which are presented. Data exchange is carried out by 8-digit bits at the rate of 9600 bands.

33563 (JINR—D-13-85-793, pp 237-239) **Units for designing multidetector system for spectrometric data storage on the base of the 16Kx24 bit memory device.** Vagov, V.A.; Korobchenko, M.L.; Sirotin, A.P. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

Main units of the system for spectrometric data accumulation on the base of the 16K x 24 bit memory device are considered. Input units: counter unit and unit for organization of analysis are described. The applied method for multiplexing data removed into the counter unit permits to essentially reduce hardware loading. Application of some special functions in the unit for analysis organization simplifies data accumulation control to a large extent. The unit for analysis organization allows application of the memory with an address field up to 64K.

33564 (JINR—D-13-85-793, pp 245-249) **Adaptive algorithm of two-level memory organization for spectrometric data storage.** Karasev, V.M.; Lastochkin, N.K. (Radievyj Inst., Leningrad, USSR). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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An algorithm ensuring automatic search for most intense regions in distributions obtained by means of multichannel analyzers with a large number of channels using direct access devices and mass memories as buffer memory for data accumulation is suggested. The considered algorithm can be realized in a program (microprogram) on in a hardware. The character of a forward-backward counter when supplying statistical signals equivalent to the investigated processes to the inlets can be applied for realization of the algorithm.

33565 (JINR—D-13-85-793, pp 250-254) **Use of the MCL dialog language for autonomous multi-channel analyzer automation.** Gyunter, Z.; Lebner, M.; Mikhaehlis, B.; Shvenkner, V.; Shul'tts, K.-Kh. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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The structure and software of a time-of-flight multichannel analyzer are considered. The analyzer is a subsystem of the measuring module of the SPN-1 polarized neutron spectrometer used in experiments at the IBR-2 reactor. The analyzer operates having several structures differing from one another by a timing coder. The MCL (MULTI-CONTROL-LANGUAGE) system is developed for control of the spectrometer. The system ensures the computer-user conversation and interfacing the computer and the experimental equipment. The MCL language is similar to that of the BASIC or the BAMBI. It has modular structure. The language interpreter and operating system have about 2 kbyte memory. The considered analyser is successfully used already during 6 months. The number of detector inputs of the analyser increased. Expenditures for alternations of programs are negligible due to modular structure of the system. Realization of new commads does not require comprehensive knowledge of the MCL language.

33566 (JINR—D-13-85-793, pp 262-265) **Computer-controlled color display for the energy dispersive X-ray spectrometer EDR 183.** Bergter, J.; Kuehnert, S. (Technische Univ., Dresden, German Democratic Republic. Sektion Physik; Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden, German Democratic Republic). 1985. NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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A new micro-computer controlled graphic display developed for applications in nuclear spectrometers is described. Central part of the device is the MPS4944 microcomputer supplied by direct memory access module boards for data input and output. Ordinate resolution of screen is 512 dots. The maximum number of channels simultaneously displayed is 512 too.

33567 (JINR—D-13-85-793, pp 332-335) **Multi-processor system on the base of the EhLEKTRONIKA-60 microcomputer for data acquisition/processing and control of spectrometric complex in experiments on searching for the double beta decay.** Bashkirov, V.A.; Kantserov, V.A.; Strigin, V.B. (Moskovskij Inzhenerno-Fizicheskij Inst., USSR). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

A multiprocessor system for data acquisition processing and control of equipment in experiments on searching for double beta decay is described. "ELECTRONIKA-60" microcomputer is utilized as the control processor in the system, and fast-response single-circuit "Electronika NMS 11100.1" microcomputers are used as auxiliary processors. Single-circuit microcomputers are connected to the head processor as peripheral devices, and channels of interprocessor communication form standard parallel exchange interfaces. Maximal speed of response of these channels at data transmission under program control makes up 180 kbyte/s. Graphical displays on the base of standard colored TV sets and CAMAC control units are included into the complex for visualizing graphical data. Configuration of the considered system permits to essentially increase possibilities of microcomputers in data receiving and processing by relatively simple means. Increase of the speed of response is attained, on the one hand, at the expense of parallel organization of data acquisition, processing and control of parameters of the facility, on the other hand, at the expense of using fast-response auxiliary processors.

33568 (JINR—D-13-85-793, pp 340-344) **Automated program-controlled multi-channel measuring module for the MSA installation.** Artyukh, A.G.; Smirnov, V.N.; Strekalovskij, O.V.; Chelnokov, L.P.; Lodojsamba, S. (Joint Inst. for Nuclear Research, Dubna, USSR; Moskovskij Gosudarstvennyj Univ., USSR). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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The structure, hardware and software of the PUMIM program-controlled measuring modulus on the base of the SM-3 computer oriented for study of inclusive distributions of nuclear reaction products, investigation into two- and three-particle correlations in the output channel of the reaction are considered. The modulus comprises 4 information linear circuits for amplitude analysis, 4 timing channels, data parth to state the fact of light particle correlation with fragments, auxiliary monitoring channel for measuring the energy of an incident particle as well as triggering the system of test pulse shaping. The programs are written in PASCAL' language for the version of the RT 11 operational system.

33569 (JINR—D-13-85-793, pp 359-361) **Autonomous system for neutron spectrometer control.** Blago, D.; Draski, V.; Kulda, I. (Ceskoslovenska Akademie Ved, Rez. Ustav Jaderne Fyziky). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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Basic parameters of the control system of the SPN 100 polarized neutron spectrometer are presented. The spectrometer is designed for measuring polarized neutron scattering when studying magnetic properties of solids. The control system is based on an autonomous programmed unit of the CAMAC crate either the version with a microprocessor system or with a TTL circuit processor.

33570 (JINR—D-13-85-793, pp 362-366) **System for Moessbauer spectroscopy controlled by a microcomputer.** Tomov, L.M.; Dimitrov, L.P.; Vankov, I.D.; Ognyanov, N.O. (Bylgarska Akademiya na Naukite, Sofia. Inst. za Yadrena Izsledvaniya i Yadrena Energetika). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

A Moessbauer spectrometer developed on the base of the "Pravets 82" microcomputer is described. The spectrometric part of the system is realized in the CAMAC standard. The Doppler modulation unit exercises control of an electromagnetic vibrator, where a radioactive source is disposed. Radiation passing through the studied sample is detected by a proportional counter supplied from the controlled high voltage source. Spectrometric CAMAC moduli have standard parameters. The microcomputer can be used for data accumulation and processing in several experiments, each of them being serviced by its interface device.

33571 (JINR—D-13-85-793, pp 367-370) **Independent Moessbauer spectrometer in CAMAC system.** Pavlovski, M.; Tsudny, V.; Piontkovski, A. (Politechnika Warszawska, Poland. Inst. Radioelektroniki). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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An independent multi-input minicomputer-controlled Moessbauer spectrometer for investigations in the field of nuclear chemistry and physics is considered. The analog part of the spectrometer comprises 2 electrodynamic bivibrators and two CAMAC crates, where analog units servicing 4 measuring circuits are disposed. The digital part of the spectrometer includes an independent data collection unit memory device and independent data display unit. Software is written in the FORTRAN language. Control of the spectrometer is exercised by means of the SM-3, SM-4, SM-1300 or MERA-60 minicomputers.

33572 (JINR—D-13-85-793, pp 371-376) **Moessbauer spectrometer.** Ormandzhiev, S.I.; Semova, T.B.; Jordanova, V.T. (Sofia Univ., Bulgaria). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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A two-channel Moessbauer spectrometer with adaptive drive control, laser control of the velocity scale, high fast response gamma-spectrometric channel and zero time multichannel pulse counter is described. The velocity range of the spectrometer is +- 1, 2, 5, 10 cm/s; maximal counting rate is equal to 3 x 10/sup 5/ pulse/s.

33573 (JINR—D-13-85-793, pp 377-380) **Combined time-Doppler positron spectrometer.** Vinarov, N.G.; Georgiev, A.K.; Mishev, P.L.; Tumbev, G.Kh. (Bylgarska Akademiya na Naukite, Sofia. Inst. za Yadrena Izsledvaniya i Yadrena Energetika). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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The circuit of a combined spectrometer for studying positron annihilation in a substance is considered. The spectrometer operation is based on the method of partial two-dimensional analysis. Several energy spectra corresponding to separated intervals of time spectrum are taken to obtain complete two-dimensional spectrum characterizing relation between positron lifetime and its energy of annihilation. Energy channel of the spectrometer comprises high-purity Ge-detector with sensitive volume of about 1.5 cm/sup 3/ and charge-sensitive preamplifier. A narrow energy range near the line of 511 keV is used for analysis.

33574 (JINR—D-13-85-793, pp 398-401) **ARGUS on-line system for gamma coincidence recording.** Andrukhovich, S.K.; Berestov, A.V.; Zyazyulya, F.E.; Martsynkevich, B.A.; Rudak, Eh.A.; Khil'manovich, A.M. (AN Belorusskoj SSR, Minsk. Inst. Fiziki). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

The structure and main characteristics of the ARGUS on-line gamma coincidence system for recording multicascade and correlated nuclear processes are considered. The recording part of the system comprises 32 standard NaI(Tl) scintillation units with the FEhU-49B photomultipliers. The system also includes hardware and software providing detector on-line operation with the SM-4 minicomputer. VISHNYA and CAMAC moduli are used in electronics for data readout. Main parameters of the facility are as follows: /sup 137/Cs photopeak efficiency at 662 keV at event multiplicity K=1 makes up 0.37; mean energy resolution for the same line - 10.6%; counting rate of the background in the 200-1500 keV energy range at K=1-5 is equal to 3400, 300, 28, 3, 1 s/sup -1/ respectively; maximal rate of data accumulation is 3000 s/sup -1/; time resolution of the facility at K=2 makes up 80 ns.

33575 (JINR—D-13-85-793, pp 420-422) **Development in electronic equipment for measuring and processing the spectrometric data in the Institute of Nuclear Researches of the Hungarian Academy of Sciences.** Lakatosh, T. (Magyar Tudomanyos Akademia, Debrecen. Atommag Kutato Intezete). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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Complex analog signal processors developed on the base of a time-dependent digital filter are considered in brief. The NZ-type processor represents a table device for X-ray fluorescent analysis. CAM.4.19-80 and ASP-84-type devices are the variants of the CAMAC and NIM processor and they are designed for application in gamma-spectroscopy. The NZ-854 complex spectrometer for X-ray fluorescent analysis includes a variant of the NZ-870 processor, an analog-to-digital converter and a microcomputer for data processing.

33576 (JINR—D-13-85-793, pp 435-437) **Digital summator-storage for nuclear spectrometric devices.** Khodov, S.M.; Somov, B.S.; Karzhavin, Yu.A.; Tsitovich, A.P.; Yukov, L.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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A summator-storage for preliminary processing of experimental data file before its transmission to the central processor is described. The considered device exercises summation of input binary codes with information of cells of internal memory at cyclic scanning of cell address in synchronism with cycles of data input. It represents double CAMAC module and permits to set up a correspondence between fast response of certain sections of the measuring circuit and speed of response of the central processor. The summator-storage is used in the circuit for recording of free induction signals in the NMR-introscope system.

33577 (JINR—D-13-85-793, pp 53-57) **Microprocessor control complex with local and system buses for the real time CAMAC systems and networks.** Vinogradov, V.I. (AN SSSR, Moscow. Inst. Yadernykh Issledovanij). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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The structure of a microprocessor set of the CAMAC moduli intended for automation of high-energy physics experiments and for real time measurements is considered. A possibility of using standard small-sized printed circuits for the ELEKTRONIKA-60 microcomputer as well as the basic set of input-output means is provided when developing the moduli.

33578 (JINR—D-13-85-793, pp 194-198) **VD-411 branch driver.** Gorbunov, N.V.; Karev, A.G.; Mal'tsev, Eh.I.; Morozov, B.A. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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The VD-411 branch driver for CAMAC moduli control by the SM-4 computer is described. The driver realizes data exchange with moduli disposed in 28 crates grouped in 4 branches. Data exchange can be carried out either in the program regime or in the regime of direct access to the memory. Fulfilment of 11 block regimes and one program regime is provided for. A possibility of individual programming of exchange methods in block regimes is left for users for organisation of quicker and most flexible data removal from the CAMAC moduli. In the regime of direct access the driver provides data transmission at the size up to 64 Kwords placing it in the computer memory of 2 M byte. High rate of data transmission and the developed system of interruptions ensure efficient utilization of the VD-411 branch driver at data removal from facilities in high energy physics experiments.

33579 (JINR—D-13-85-793, pp 209-213) **Time-to-digital converter with generalized measurer of 32 inputs.** Zamyatin, N.I. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

A time-to-digital converter (TDC) intended for signal recording from drift chambers at low loads of the detecting plane is described. TDC principle of operation is based on direct time-to-digit conversion at maximum clock time frequency of 100 MHz. Compression of input data (32 inputs represent two-dimensional matrix 4 x 8) and following coding of the positional code into a binary one (5 digits) are applied to reduce instrumental costs and TDC disposition in the CAMAC module.

33580 (JINR—D-13-85-793, pp 258-261) **Color graphic display interface for TRA-11 Family computers.** Barna, P.; Farkas, G.; Ferenczy, F.; Holba, A.; Koch, J.; Lohonyai, L.; Maroti, T. (Hungarian Academy of Sciences, Budapest. Central Research Inst. for Physics). 1985. NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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The NR5810 modular color graphic display system developed for high energy physics research is described. The display system can be used in both graphic and image modes. It is a raster scan display with a resolution of 512 x 512 points. The number of bit planes is variable up to eight. The system is designed to be used with TPA-11 series computers. The subroutine library contains routines to make interactive work possible from an alphanumeric console terminal, under both RT-11 and RSX-11M operating systems.

33581 (JINR—D-13-85-793, pp 268-277) **Low noise analog signals acquisition system for the vertex detector of E687 Fermilab experiment.** Bellini, G.; D'Angelo, P.; Inzani, P.; Moroni, L.; Pedrini, D.; Sala, S.; Speziali, V.; Manfredi, P.F.; Menasce, D. (Istituto Nazionale di Fisica Nucleare, Milan, Italy; Milan Univ., Italy; Pavia Univ., Italy). 1985. NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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A microstrip vertex detector designed for E-687 experiment which is beginning now at the Fermilab Tevatron is described. Main performances of electronic blocks forming an analog signal acquisition system which is intended to be employed in connection with the detector are given. The experiment aims at investigating photoproduction of state containing heavy quarks and other rare phenomena by using a bremsstrahlung photon beam with a maximum energy of 600 GeV. Two kinds of active targets will be employed, solid-state detectors and scintillating fibers. The purposes of the active targets are locating the primary vertex, helping in reconstruction of secondary vertices corresponding to short-lived states and recognizing the nature, either coherent or incoherent of the primary interaction. The active target is followed by a microstrip vertex detector made of four position-sensing sets. Each set consists of three microstrip planes with the strips directed along X, Y and U axes, where U is 45 deg rotated one with respect to X. The performances of the vertex detector are strongly affected by the noise level in the front-end electronics. Besides the counting rates on each microstrip plane approach 10/sup 6/ pps. Therefore special hybrid preamplifiers were developed. They are connected to the strips by a flexible printed circuit fan-out using Kapton as a support. A fast analog-to-digital conversion system has been developed for data acquisition from the vertex detector with the aim of making second level trigger decisions, based on sophistical algorithms possible.

33582 (JINR—D-13-85-793, pp 278-281) **Data acquisition, recording and readout units for proportional chambers.** Basiladze, S.G.; Ehloev, O.Z. (Moskovskij Gosudarstvennyj Univ., USSR). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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A system of electronic units for data acquisition, recording and readout from large proportional chambers is described. The system comprises an 8-channel amplifier-shaper, 64-channel recording modulus and specialized crate controller for data filtration and readout.

33583 (JINR—D-13-85-793, pp 282-286) **Electronic circuits for recording signals from drift chambers.** Golutvin, I.A.; Zamyatin, N.I.; Karpukhin, A.V.; Khabarov, V.S. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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Electronic equipment for recording signals from wide-gap drift chambers (drift gap equas 125 mm) of the experimental facility "Neutrino detector" is described. The equipment is designed for measuring time of pulse arriving on signal wires of the drift chambers and recording numbers of operated wires. The equipment can record 255 signals from each group of 64 wires. Dead time of the recording channel makes up 50 ns. Time resolution is +-6 ns.

33584 (JINR—D-13-85-793, pp 287-290) **Special processor for selecting events by the effective mass of three pions.** Borisova, M.N.; Valuev, Yu.M.; Grebenyuk, V.M.; Zinov, V.G.; Selikov, A.V. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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A trigger special processor for selecting events in experiments on studying the three-pion coherent production on different nuclei is described. The experiments are carried out at the U-70 accelerator by means of the MIS-2 magnetic spark spectrometer in the > 1.8 GeV and < 0.8 GeV mass range. Two mutually perpendicular proportional chambers are placed in the facility for effective selecting events in these ranges. The processor includes 4 CAMAC units.

33585 (JINR—D-13-85-793, pp 291-295) **Organization of multi-level triggering and data acquisition in experiments on studying relativistic positronium using dialog and microprogrammed processors.** Karpukhin, V.V.; Kuptsov, A.V.; Frolikov, S.M.; Shumakov, M.N. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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A multilevel triggering system for data acquisition on studying positronium decay in experiments at the U-70 accelerator is considered. Produced electrons and positrons are detected by two telescopes comprising three sets of drift chambers (2500 detecting channels) as well as scintillation and Cherenkov counters. Detector loading makes up 1.5 x 10/sup 6/ particlesxs/sup -1/. The multilevel triggering system ensures decrease of dead time of the system and increase of the coefficient of legitimate event selection. A special 16-digit microprogrammed processor which executs of data selection by two geometrical criteria in X-projection is used for increase of efficiency of data acquisition system. The facility control is realized using a dialog microcomputer without data receipt. Software of data acquisition system is essentially simplified here and a possibility of quick development and initiation of new programs arises.

33586 (JINR—D-13-85-793, pp 296-300) **Equipment for selecting events in experiments with streamer chamber at the U-70 synchrotron.** Adam, D.; Behm, Ya.; Vyskochil, S. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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Specific features of electronic circuits used for selection of events recorded by means of a magnetic spectrometer with the RISK streamer chamber are considered. Basic circuits of equipment utilized in experiments on studying particle production with a large transverse momentum when investigating μ/sup +/μ/sup -/ dimuon production are presented.

33587 (JINR—D-13-85-793, pp 301-305) **System for acquisition and rapid processing of data from the GIPERON spectrometer.** Asmolov, A.G.; Budagov, Yu.A.; Semenov, A.A.; Sergeev, S.V.; Flyagin, V.B.; Seman, M.; Shpalek, J. (Joint Inst. for Nuclear Research, Dubna, USSR; Slovenska Akademia Vied, Bratislava, Czechoslovakia. Fyzikalny Ustav). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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Software and hardware used in data acquisition, system for rapid processing and control of the GIPERON facility operating at the IHEP accelerator and designed for study of elementary particle interactions at high energies are considered. The data acquisition system comprises units permitting to receive major part of data to the computer memory in the regime of direct access. The system crate of the data acquisition system is connected to the computer by means of special universal rapid device for interfacing with microprogram control. High modular software is applied. Further on, it is planned to essentially increase rate of statistics accumulation (from 70-200 to 500 events per accelerator cycle). Rapid specialized microprogrammed processors at the efficiency of 5 mln. operations/s are used to improve selection of events according to some physical criteria.

33588 (JINR—D-13-85-793, pp 310-313) **Systems of triggering and data readout for the ARES spectrometer.** Baranov, V.A.; Vanko, Yu.; Evtukhovich, P.G. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

The ARES spectrometer triggering and data readout systems are described. The spectrometer is a system of coaxial cylindrical proportional chambers and scintillation hodoscopes placed in a magnetic field. The detector is 600 mm high, its diameter is 1060 mm. Data from scintillation hodoscopes and proportional chambers are used in the spectrometer trigger system. Majority logic is applied in the considered systems due to the fact that the number of elements in the detecting system is large (up to 15,000 channels) and the events to be recorded are multiparticle. Schemes of fast programmed memory K500PE 149 are used as elements for selection of legitimate evens besides standard units of fast logics. All the systems of fast logics are realized in two 120 and 80 mm broad VISHNYA units. The control of parameters of the spectrometer is exercised by a system on the base of digital voltmeter, KA 004 analog commutators and KM 001 microcomputer.

33589 (JINR—D-13-85-793, pp 314-318) **Particle identification in the MASPIK time-of-flight magnetic spectrometer.** Azhgirej, L.S.; Zarubin, P.I.; Ivanov, V.V.; Kuznetsov, A.S.; Stoletov, G.D. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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Characteristics of the system for time-of-flight measurement in the MASPIK magnetic spectrometer with wire chambers designed for studying the nuclear reaction mechanism in extracted beams of relativistic nuclei at the JINR synchrophasotron are considered. The functional diagram of the utilized equipment and mass distribution of secondary particles detected by the spectrometer in the range of momenta of 5.7-8.5 GeV/s are presented. Pulses from two scintillation detectors placed at the distance of 21.9 m from one another are applied for determining time-of-flight of particles detected by the main arm of the spectrometer. These counters are switched also into the trigger system of the facility. The attained time resolution permits to strictly separate protons and deuterons.

33590 (JINR—D-13-85-793, pp 319-323) **Electronics for event selection and processing the data from the MD-2 detector.** Aul'chenko, V.M.; Baru, S.E.; Groshev, V.R.; Onuchin, A.P.; Savinov, G.A. (AN SSSR, Novosibirsk. Inst. Yadernoj Fiziki). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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The MD-2 detector developed for in-beam experiments on the VEPP-4 storage ring is described in brief. Performances of electronics for event selection and processing of the spectrometer data are considered. The coordinate part of the detector placed in a homogeneous magnetic field represents a cube with a rib equal to 120 cm, through which the storage ring vacuum chamber passes. Field direction is orthogonal to the orbit plane. Beam colliding point is in the middle of the cube. The cube is uniformly filled with vertically stretched wires at the distance of 1 cm from one another. This wires form 5000 drift cells. The drift system is surrounded by scintillation counters behind which threshold Cherenkov counters are placed. Electronics for event recording is disposed in special crates. Each crate comprises 16 information printed circuits and service ones - output processor and interfaces of primary and secondary triggers. Information printed circuits are designed for acquisition and processing timing, amplitude and mixed amplitude-timing data. Timing channel width is 2 ns, number of digits at time measurement equals 8, at charge and amplitude measuring it is equal to 12.

33591 (JINR—D-13-85-793, pp 324-328) **High-capacity system for physical information processing.** Aksenov, G.A.; Bejlin, M.B.; Merzlyakov, Yu.I.; Sazanskij, V.Ya. (AN SSSR, Novosibirsk. Inst. Yadernoj Fiziki). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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A system for processing data from magnetic tapes obtained in experiments on studying electron-positron interactions by means of the MD-1 magnetic detector at the VEPP-4 storage ring is described. The AP-20 arithmetic processor with proper control device, mass memory and a system of commands is the nucleus of the system. The processor exercises event reconstruction in the coordinate volume of the detector by means of special programs. Efficiency of the system is rather high: the system forms one tape per day of 12-15 primary magnetic tapes on which data obtained directly in the experiment are recorded.

33592 (JINR—D-13-85-793, pp 389-393) **Program-controlled manipulator for selecting the sensitivity of Cherenkov counters in a multi-channel gamma spectrometer.** Belikov, N.I.; Zhadkevich, A.L.; In'shakov, V.I. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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The design and specifications of a manipulator for calibration of 800-channel gamma-detector intended for investigation of polarized effects in π/sup -/N-interactions are considered. Control of detector channel sensitivity is exercised by the change in anode voltage of photoelectron multipliers by means of SPZ-37B type multirevolution resistors. The program control system of the manipulator is developed on the base of HP-1200 computers and unitized control moduli realized in the SUMMA standard. Utilization of the manipulator reduces by several dozens hours time of experiment preparation.

33593 (JINR—D-13-85-793, pp 431-434) **Application of charge digitizers in neutron-gamma pulse shape discrimination.** Kreciejewski, M.; Kulka, Z.; Nadachowski, M. (Institute of Nuclear Research, Warsaw, Poland). 1985. NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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A double charge digitizer designed for a system with scintillation detector for neutron-gamma pulse shape discrimination is described. The digitizer can be also used for measurement of nuclear particle and radiation energy as well as for measuring short time intervals in the nanosecond range. The neutron-gamma pulse shape discrimination is realized by measuring a ratio of the whole charge to the slow component charge.

33594 (JINR—D-13-85-793, pp 30-35) **ALEPH time projection chamber readout system.** Konoplyannikov, A.; Millerin, B.; Stefanini, G. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij; European Organization for Nuclear Research, Geneva, Switzerland). 1985. NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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Electronics of the ALEPH detector to be installed at the LEP storage ring is considered. The central part of the detector is a Time Projection Chamber (TPC) which records tracks of ionizing particles by drifting the primary ionization to one of the end plates of the cylinder. The end plate is covered by a grid of sense wires which anplify the primary ionization. Each avalanche produced at a sense wire induces a pulse into the metallic surface of the cathode. By means of a fine segmentation of the cathode into rectangular areas (pads) the position of the avalanche can be determined TPC contains 44,000 pads and 6000 wires, that significantly impedes the signals readout. The detector electronics includes three main components, namely, the analog chain, digitizing electronics and processing and readout modules. Main characteristics of these circuits are given.

33595 (JINR—D-13-85-793, pp 329-331) **Problem-oriented two-level complex for studies on the base of the neutron diffractometers.** Kadashevich, V.I.; Kasman, Ya.A.; Krasnoshchekova, I.A.; Petrova, V.I.; Ruzin, S.M.; Tyukavin, V.A.; Ivanov, V.V.; Gorokhov, I.S.; Golosovskij, I.V. (AN SSSR, Leningrad. Inst. Yadernoj Fiziki). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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A specialized two-level complex of three computers united in a local network by means of the CAMAC moduli of intercrate communication is considered. The complex services 2 experimental facilities: multicounter diffractometer for studying polycrystals and diffractometer for operation with monocrystals. Both devices are installed in the horizontal channel at the LIYaF WWR-M reactor and operate with one monochromator. The lower level is realized on the base of the "ELEKTRONIKA-60" microcomputer, the upper level - on the base of the SM-3 computer. Software of the complex is realized within the frames of the RAFOS operational system in FORTRAN and MACRO languages.

33596 (JINR—D-13-85-793, pp 353-358) **Microprocessor controlled equipment for particle identification and energy analysis.** Gombosi, T.; Kecskemeti, K.; Kozma, G. (Magyar Tudomanyos Akademia, Budapest. Mueszaki Fizikai Kutato Intezete). 1985. NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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The TUNDE cosmic ray detector being a part of scientific instruments on board the VEGA space probes is described. The main tasks of TUNDE are detection of ions originating from the Halley's comet and determination of their energy distribution and, in addition, during the flight of approximately 15 months identification and energy measurement of various particles of the cosmic radiation emitted by the Sun. Two telescopes consisting of two semiconductor detectors and an anticoincidence scintillation detector each are used for the particle detection. The angle between the telescopes is 35 deg providing the information also on the angular distribution of cosmic radiation. The system performs energy analysis of ions in the range of 20-650 keV in 64 channels, identifies electrons, protons, alpha and heavier particles and measures their energy up to 13 MeV. The dimension of the apparatus is 150 x 190 x 229 mm, the weight is 4.8 kg, the power consumption is 5 W. The signals coming from the telescopes are processed and digitized by two independent analogue processing units. The digital processing unit performs data compression and temporary storage then it transmits the data to the central telemetry of the space probe. The first measurement results have already been received from VEGA1 and VEGA2. The preliminary evaluation of the data shows that both TUNDE units operate in accordance with the specifications.

33597 (JINR—D-13-85-793, pp 381-383) **Automated crystal diffraction spectrometer for measuring characteristis X radiation of multicharged ions.** Vagner, V.; Dunin, V.B.; Karrash, G. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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A spectrometer for measuring characteristic X radiation of multicharged ions is described. A laser interferometer for precise measurement of the rotation angle of the crystal-analyzer, a system for laser positioning of device components as well as a system for temperature stabilization are developed to provide high resolution (of the order of eV), relative aperture and high accuracy of measurements. The MERA-60/30 minicomputer is used for automation of measurements. All the program-controlled units are realized in the CAMAC standard.

33598 (JINR—D-13-85-793, pp 384-388) **Intensitometer with microprocessor control.** Myuller, M.; Vankov, I.; Ivanov, R.; Zlatarov, V. (Bylgarska Akademiya na Naukite, Sofia. Inst. za Yadrena Izsledvaniya i Yadrena Energetika). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

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An intensitometer differing by high speed of response and having wide opportunities of data processing and output and having compact design is described. Optimum combination of accuracy and speed of response is provided by using an original adaptive method for determination of mean frequency of input pulses. The method is based on two parallel measurements. The first one is applied to exercise continuous control of the value of mean frequency. For this purpose the measurements are carried out during short periods of time with slight accuracy but high speed of response. At the same time basic measurement is carried out by averaging repetition of all the incoming pulses from the beginning of the cycle, that ensures high accuracy. Geiger-Muller halogen counter is used as a proper detector. The microprocessor system is developed on the base of the SM 600.

33599 (JINR—D-13-85-793, pp 402-403) **Electronic circuits for measuring low radioactivities by means of proportional counters.** Yanik, R.; Pleshko, M.; Povinets, P.; Franko, J. (Komenskeho Univ., Bratislava, Czechoslovakia). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

A possibility of using multi-component proportional counters located between several layers of cylindrical proportional chambers for measuring /sup 3/H, /sup 14/C, /sup 85/Kr, /sup 133/Xe and /sup 135/Xe low-level radioactivities is discussed. The system has 3 outputs each of them having proper electronics channel. It permits to connect elements in coincidences or anticoincidences. Electronics of the system comprises channel counters, a timer, exposure counters, a data unit and a memory. Data can be displayed, recorded on a magnetic tape or transmitted to the CAMAC dataway.

33600 (JINR—D-13-85-793, pp 404-407) **Modular system of nuclear-physical electronics for astrophysical studies.** Glyanenko, A.S.; Grigor'ev, A.I.; Kurochkin, A.V.; Tyshkevich, V.G. (Moskovskij Inzhenerno-Fizicheskij Inst., USSR). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

A modular electronic system for astrophysical studies at high-altitude aerostats is described in brief. Microcircuits of K561, K537, K588, K572 series are utilized as an elements in digital moduli. Units of preliminary selection including integrated and differential discriminators, pulse duration shapers of coincidence and anticoincidence circuits, moduli for amplitude analysis oriented for operation with NaI(Tl), CsI(Tl) inorganic scintillators; units for measuring counting rates; special processors for event selection intended for searching non-stationary radiation fluxes, auxiliary moduli and testing units are developed specially for utilization in the system.

33601 (JINR—D-13-85-793, pp 423-427) **Electronic equipment for one-coordinate position sensitive neutron detector with high-ohmic filament.** Balagurov, A.M.; Gordelij, V.I.; Zhironkin, G.F.; Le Kkhak Man'; Novozhilov, V.E.; Rodionov, K.G.; Tishin, V.G. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

Electronic equipment for a neutron diffractometer with one-coordinate position-sensitive detector representing a gas proportional He/sup 3/-counter with high-ohmic anode is described. The complex comprises preamplifiers, spectrometric amplifiers, signal stretcher, fast amplitude-to-digital converters, digital special processor for determination of position code by codes of two amplitude signals from edges of the detector. Special software is developed for operation of the complex with microprocessor crate-controller. The considered complex is used in experiments at the IBR-2 reactor.

33602 (JINR—R-9-85-707, pp 240-241) **High-time resolution time-of-flight telescope testing.** Buran, V.; Kroga, V.; Dukhanov, V.I.; Stepanov, D.N. (Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia; Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1985. (In Russian). NTIS (US Sales Only), PC A16/MF A01. File Number DE87780133. (CONF-8506350—).

From International conference on cyclotrons and their application; Bechine, Czechoslovakia (25 Jun 1985).

The results of time-of-flight telescope testing based on microchannel plates (MCP) with a coaxial anode and electron emitter are presented. The monitoring has been carried out at the isochronous cyclotron α-particle extracted beam with the energy of 34 MeV. Au and /sup 12/C targets have been used to determine the telescope parameters. The telescope flight-path length was 160 +- 1 mm. The telescope time resolution constituted 174 +- 19 ns. The monitoring results showed that application of time registers on the basis of MCP opened new possibilities for particle mass identification at the cyclotron. 1 ref.; 1 fig.

33603 (JINR-R—1-86-248) **Identification of charged hadrons in the BIS-2 spectrometer.** Gus'kov, B.N.; Devitsin, E.G.; Dzhordzhadze, V.P. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1986. 10p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702343.

Submitted to the journal Instrum. Exp. Tech.

Charged hadron identification system for the BIS-2 spectrometer is described. The basis of the system are two multichannel threshold gas Cherenkov counters and a corresponding algorithm for experimental information analysis. The results of the system characteristic investigation are presented. It is shown that the system allows one to identificate charged hadrons with a sufficient reliability in observed multiparticle events. In particular, the system allows the selection in the effective mass spectra of the processes with charged kaons and it reduces the background level in the effective mass spectra. 9 references, 4 figures, 1 table.

33604 (JINR-R—1-86-254) **Hadron suppression by means of active converter, scintillation counter and Cherenkov counter of total absorption.** Astvatsaturov, R.G.; Vasil'ev, S.E.; Plyashkevich, S.N.; Khachaturyan, M.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1986. 4p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702345.

The possibility of hadron suppression using the system consisting of an active lead glass converter, Cerenkov lead glass γ-spectrometers and a scintillation counter operating in the dE/dx mode was investigated in the 3 GeV/c π^--meson beam containing 2.8% of electrons. The application of the system makes it possible to increase the hadron suppression by a factor of 5 as compared to the case when total absorption counters are used. The efficiency of electron detection is about 100%. 5 references, 4 figures.

33605 (JINR-R—3-86-184) **Energy dependence of neutron detector sensitivity in the energy range from 17 keV up to 1 MeV.** Komochkov, M.M.; Mokrov, Yu.V. (Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of Radiation Safety). 1986. 6p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702364.

The results of experimental determination of sensitivity of neutron detectors used as dosimeters in the energy range from 17 keV to 1 MeV are presented. The measurements were performed in the EhG-2.5 accelerator. Monoenergetic neutrons were produced in the T (p, n)^{3}He reaction at different proton energies. The detectors were placed at angles from 30 deg to 120 deg to proton beam direction. The detector sensitivity was evaluated by comparison of their values with those of the OVC-3M standard neutron counter. The obtained results could be used for determining energy dependences of sensitivities of detectors under study and for evaluating the errors of measurements of neutron doses in the radiation fields behind nuclear-physical installation shielding. 7 references, 6 figures.

33606 (JINR-R—6-86-320) **YaSNAPP-2 multidetector correlation system.** Abrosimov, V.N.; Vasilev, D.; Adam, I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1986. 14p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702371.

A multi-detector system for γ-γ-angular correlation measurements is described. The system will operates on-line with mass separator in the frame of the YaSNAPP project. The system consists of Ge(Li)-detectors, mechanism for radioactive source transport and electronics. Time curves for various pairs of the detectors measured using ^{60}Co source and angular correlation coefficients for the cascade 4(2)2(2)0 in ^{60}Ni are presented. 34 references, 5 figures, 3 tables.

33607 **(JINR-R—6-86-394) Program system for constructing radionuclide decay schemes.** Adam, I.; Gonusek, M.; Pejn, I.; Tlusty, P. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1986. 14p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702372.

A set of programs is proposed for constructing decay schemes of atomic nuclei. These programs use experimental results obtained in the investigation of spectra of gamma radiations, internal conversion electrons and differential-integral coincidences measured by means of the anticompton spectrometer. 12 references, 2 figures, 1 table.

33608 **(JINR-R—10-86-261) Measurement procedure and results of scanning the track images on the RISK spectrometer films by means of the AEhLT-2/160 tube.** Vertogradov, L.S.; Stepanenko, V.A.; Shelkov, G.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1986. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702376.

Results of multiple measurements of single tracks of pions minus from 40 GeV/c beam and those of high-contrast images imitating the tracks in the RISK streamer spectrometer are given. The measurements are made by means of a scanning measuring projector with the AEhT-2/160 cathode ray tube. The dependence of basic values charactering of track microstructure (lacunarity, streamer diameter) on scanning parameters are investigated. This method allows one to measure these characteristics with 3% accuracy. 12 references, 3 figures, 3 tables.

33609 **(JINR-R—10-86-412) Algorithm for the selection of a physical hypothesis on the basis of the preliminary scanning results.** Balgansurehn, Ya.; Glagolev, V.V.; Govorun, N.N.; Ivanov, V.G.; Pervushov, V.V.; Pestova, G.D.; Kacharava, A.K.; Khachatryan, A.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation). 1986. 10p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702377.

An algorithm intended for automatic selection of physical hypotheses from the results of event kinematical identification by the assigned selection criteria is described. Visual estimates of particle track image density which are produced by preliminary scanning are taken into account. This algorithm was tested on the data array of about 40 thousand events obtained in three experiments. Introduction of the algorithm into data processing allows to reduce by several times the period of experimental data analysis and essentially simplifies this process. 6 references, 4 figures.

33610 **(JINR-R—10-86-472) Program for SHP processor data filtration in the HPD minimum guidance system.** Baginyan, S.A.; Govorun, N.N.; Shestakova, G.V.; Shigaev, V.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation). 1986. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702378.

General description of an algorithm and specific features of realization using the CDC-6500 computer of the program for filtration of events measured with the HPD scanning automatic device using a special processor on-line with the CDC-1604A computer are given. The program is intended for processing images from liquid hydrogen bubble chambers in the minimum guidance mode (with vertex point premeasurement). 5 references, 2 figures.

33611 **(JINR-R—10-86-556) SATURN program package for a multichannel analyzer based on the SM type microcomputer and CAMAC apparatus.** Nefed'ev, O.K. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions). 1986. 4p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702379.

A program package for a multichannel analyser based on a SM-type microcomputer and CAMAC modules is described. Two versions of the package written in MACRO and FORTRAN 4 provide acquisition and processing of the data arriving from nuclear radiation detectors. The set of interactive commands providing an operator - system dialogue is given. The speed of response for different modes of analysis is also indicated. 10 references.

33612 **(LBL—21566) Silicon radiation detectors with oxide charge state compensation.** Walton, J.T.; Goulding, F.S. (Lawrence Berkeley Lab., CA (USA)). Oct 1986. Contract AC03-76SF00098. 8p. (CONF-861007—27). NTIS, PC A02. File Number DE87007180.

From Nuclear science and nuclear power systems symposium; Washington, DC, USA (29 Oct 1986).

This paper discusses the use of boron implantation on high resistivity P-type silicon before oxide growth to compensate for the presence of charge states in the oxide and oxide/silicon interface. The presence of these charge states on high resistivity P-type silicon produces an inversion layer which causes high leakage currents on N^+P junctions and high surface conductance. Compensating the surface region by boron implantation is shown to result in oxide passivated N^+P junctions with very low leakage currents and with low surface conductance.

33613 **(NYSERDA—86-13) Development of an electret passive environmental radon monitor: Final report.** Kotrappa, P.; Dempsey, J.C.; Hickey, J.R. (Plastic Casting, Inc., Olean, NY (USA)). Apr 1987. 103p. NTIS, PC A06. File Number DE87900661.

The electret passive environmental radon monitor (E-PERM) is an extension of electret dosimeters developed for the measurement of x and gamma radiation. It simply consists of a small cup containing an electret at the bottom and a filtered inlet at the top. Radon entering through the filter causes ionization inside the cup, and the ions are collected by the electret. The reduction of charge (surface potential) on the electret is a measure of integrated radon exposure. Based on a study of random error sources, the overall accuracy of the E-PERMs developed is estimated to be +- 9%. Some of the errors involved can be reduced substantially. The surface voltage of electrets made from FEP teflon was shown to be very stable even under extreme environmental conditions of temperature and relative humidity. Using an alpha source to simulate a high concentration of radon, E-PERM response was shown to be humidity independent over the operating range. A preliminary cost analysis indicates that both the production cost and reuse cost of E-PERMs may approximate $3.00 plus overhead.

33614 **(UCID—20644) Improvements in apparatus and procedures for using an organic liquid scintillator as a fast-neutron spectrometer for radiation protection applications.** Thorngate, J.H. (Lawrence Livermore National Lab., CA (USA)). 15 May 1987. Contract W-7405-ENG-48. 144p. NTIS, PC A07/MF A01; 1; GPO Dep. File Number DE87010622.

For use in radiation protection measurements, a neutron spectrometer must have a wide energy range, good sensitivity, medium resolution, and ease of taking and reducing data. No single spectrometer meets all of these requirements. Several experiments aimed at improving and characterizing the detector response to gamma rays and neutrons were conducted. A light pipe (25 mm) was needed between the scintillator cell and the photomultiplier tube to achieve the best resolution. The light output of the scintillator as a function of gamma-ray energy was measured. Three experiments were conducted to determine the light output as a function of neutron energy. Monte Carlo calculations were made to evaluate the effects of multiple neutron scattering and edge effects in the detector. The electronic systems associated with the detector were improved with a transistorized circuit providing the bias voltage for the photomultiplier tube dynodes. This circuit was needed to obtain pulse-height linearity over the wide range of signal sizes. A special live-time clock was built to compensate for the large amount of dead time generated by the pulse-shape discrimination circuit we chose to use. 64 refs., 58 figs., 9 tabs.

33615 **(UCRL—96589) A nuclear physics IR [interaction region] for PEP: Issues and conceptual design.** Van Bibber, K. (Lawrence Livermore National Lab., CA (USA)). Apr 1987. Contract W-7405-ENG-48. 22p. (CONF-870165—6). NTIS, PC A02/MF A01; GPO Dep. File Number DE87010270.

From Workshop on electronuclear physics with internal targets; Stanford, CA, USA (5 Jan 1987).

A conceptual design for a nuclear physics interaction region at PEP is presented. The design is based on components of the 2γ (PEP-9) detector, configured as a large acceptance forward angle spectrometer suited for asymmetric fixed target kinematics. The system is evaluated with a prototype experiment in mind, namely pion production in quasielastic kinematics, (e,e'π). Issues and open questions particular to internal target work are discussed. 6 refs., 10 figs.

33616 **Kratky block-collimation small-angle x-ray diffractometer for synchrotron radiation.** Chu, B.; Wu, D.; Wu, C. (Chemistry Department, State University of New York at Stony Brook, Stony Brook, New York 11794-3400). *Review of Scientific Instruments;* **58**: No. 7, 1158-1163(Jul 1987).

A block slit collimation system of the Kratky design concept has been modified and adapted for synchrotron radiation. The building block small-angle x-ray diffractometer (SAXD) not only retains the essential advantages of the Kratky camera, i.e., accessibility at small values of q[= $(4\pi/\lambda)\sin(\theta/2)$ with λ and θ being the x-ray wavelength and the scattering angle, respectively] and ease of alignment, but also provides portability and low construction cost. With our SAXD operating at the SUNY X21A beamline of the National Synchrotron Light Source, we were able to reach θ—1 mrad corresponding to q—0.04 nm^{-1} (or a Bragg spacing of 150 nm) using an incident slit width (d) of 0.5 mm and λ = 0.15 nm. At d = 0.5 mm, —10% of the monochromatic synchrotron x-ray radiation passed through the block collimation system and a parasitic intensity to main beam intensity ratio of -10^{-5} at θ = 1 mrad was achieved. With d—0.1 mm, it is anticipated that q —0.01 nm^{-1} can be accessible. By changing the vacuum tube length between the sample chamber and the beam stop from —1400 to —200 mm, we could reach an intermediate q range of —0.04approx. <qapprox. <10 nm^{-1} using a 5-cm-long linear position-sensitive detector with a resolution of —100 μm/channel. A description of the SAXD and its operation is presented.

33617 **Response of drift tubes to variations in wire diameter and gas filling.** Lee, D.M.; Bilskie, J.R.; Sanders, G.H. (Los Alamos National Lab., NM, USA). *NIMRD;* **256**: No. 2, 329-332(1 May 1987).

A systematic study of the response of single-wire drift tubes to variations in the wire diameter and gas fillings has been conducted. Gas gain as a function of applied voltage and pulse-shape characteristics were measured for both the proportional and streamer modes. Argon gas fillings with mixtures of ethane, methane, isobutane, and carbon dioxide were studied. Ethanol and isopropyl alcohol admixtures were added to determine effects on stability. Additional studies were conducted on nonstandard gas mixtures such as Freon and neon fillings, and "magic gas". Wire diameters included in the study were 20, 25, 50, and 100 μm. The results demonstrate that streamer operation can be achieved with most gases and wire diameters. However, in most cases, admixtures of alcohol were necessary to obtain adequate streamer mode plateaus for the smaller diameter wires.

33618 **Ionization and scintillation signals produced by relativistic La ions in liquid argon.** Crawford, H.J.; Doke, T.; Hitachi, H.; Kikuchi, J.; Lindstrom, P.J.; Masuda, K.; Shibamura, E.; Nagamiya, S. (California Univ., Berkeley, USA. Space Sciences Lab.; Waseda Univ., Tokyo, Japan. Science and Engineering Research Lab.; Lawrence Berkeley Lab., CA, USA; Saitama Coll. of Health, Urawa, Japan; Tokyo Univ., Japan. Dept. of Physics). *NIMRD;* **256**: No. 1, 47-54(15 Apr 1987).

We have observed simultaneously the ionization and scintillation signals produced by relativistic La ions in liquid argon. The two signals are highly correlated and the sums of these signals are constant with the standard deviation of 1.2% over the range of the electric field from 0 to 7.5 kV/cm. The ratio of the sum signals expressed in unit of the number of species to the value N/sub i/ + N/sub ex/ is close to unity where N/sub i/ and N/sub ex/ are the numbers of ion pairs and excitons, respectively, produced by La ions in liquid argon. The pulse height resolution of the sum of the signals is better than that of ionization or scintillation alone. Almost no quenching is found in the scintillation signal from relativistic La ions when compared to signals from lighter ions.

33619 **Radiation detector spectrum simulator.** Wolf, M.A.; Crowell, J.M. (to Dept. of Energy, Washington, DC). US Patent 4,658,222. 14 Apr 1987. Filed date 9 Apr 1985. vp.

This patent describes a portable battery powerable nuclear spectrum simulator comprising: noise source means for generating pulses with a Gaussian distribution of amplitudes; switched dc biased means for modulating the amplitude of pulses generated by the noise source means; and pulse shaping means fed by the switched dc bias means for generating short rise and long tail pulses therefrom, thereby producing a spectral distribution of pulses that closely simulates the spectrum produced by a radiation source.

4402 Radiation Effects On Instrument Components, Instruments, Or Electronic Systems

REFER ALSO TO CITATION(S) 32749, 33210, 33416

33620 (INIS-mf—10889, pp 50) **Transmission losses in γ-irradiated PCS optical fibers.** Kucharski, M.; Prasil, Z.; Sandera, M. (Vyzkumny Ustav Spoju, Prague, Czechoslovakia; Ustav pro Vyzkum, Vyrobu a Vyuziti Radioisotopu, Prague, Czechoslovakia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33621 **(SAND—87-0299C) The retention characteristics of nonvolatile SNOS memory transistors in a radiation environment: Experiment and model.** McWhorter, P.J.; Miller, S.L.; Dellin, T.A.; Axness, C.L. (Sandia National Labs., Albuquerque, NM (USA)). 1987. Contract AC04-76DP00789. 5p. (CONF-870724—9). NTIS, PC A02. File Number DE87005857.

From 24. annual conference on nuclear and space radiation in electronics; Snowmass, CO, USA (28 Jul 1987).

Experimental data and a model to accurately and quantitatively predict the data are presented for retention of SNOS memory devices over a wide range of dose rates. A wide range of SNOS stack geometries are examined. The model is designed to aid in screening nonvolatile memories for use in a radiation environment.

33622 **(SAND—87-0446C) Radiation damage annealing effects at elevated temperatures in bipolar transistors for severe space environments.** Thome, F.V.; Luker, S.M. (Sandia National Labs., Albuquerque, NM (USA)). 1987. Contract AC04-76DP00789. 7p. (CONF-870575—2). NTIS, PC A02. File Number DE87006706.

From 39. National Aerospace and Electronics (NAECON) conference; Dayton, OH, USA (18 May 1987).

When bipolar and other silicon semiconductors are exposed to a reactor or to a space environment, it is possible to reduce radiation damage effects by operating the devices at elevated temperatures. If the energies of radiation at the location of the device are sufficiently low, permanent lattice displacements will not occur and annealing of the damage will take place. In general, reactor gamma photon energies fall below 1.5 MeV and the peak of neutron energies is below 1 MeV. Shielding usually reduces the energies of radiation reaching semiconductor devices below these values. Damage produced at ambient temperatures by such radiation can be annealed subsequently but few measurements have been made with irradiation at very high temperatures. The purpose of the present work was to determine ranges of dose and temperature in which annealing will allow continued operation of representative devices. A series of experiments was conducted on discrete epitaxial planar 2N2222A commercial transistors with environments of gamma radiation only (at 25°C) and radiation with temperature at (125°C). The devices were exposed to gamma radiation exceeding 200 Mrad (air). The transistors were Class A biased with the resistors selected to optimize the current stability over the temperature range of 25°C to 125°C. The gain of those devices operated at 1 milliamp and at ambient temperature decreased to about 2% of their original

value. For transistors biased at a collector current of 10 milliamps and run at 125°C, the gain dropped to only 48%. This work has demonstrated a number of important considerations. When working at elevated temperatures in situ measurements are a necessity. When designing circuits and enclosures, elevated temperature operation should be considered. These results and others are presented.

33623 **(UCID—21061) Electromagnetic susceptibility testing of electronic subsystems by direct injection.** King, R.J. (Lawrence Livermore National Lab., CA (USA)). May 1987. Contract W-7405-ENG-48. 16p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009982.

A proposed direct injection technique for testing the electromagnetic susceptibility of electronic subsystems is outlined. This technique accounts for the highly complex structure of the threat signal appearing at the terminals of the subsystem, and permits the susceptibility level to be precisely and continuously measured over a wide frequency spectrum. It takes advantage of the high precision attainable from modern frequency domain instruments, as well as time domain pulsing to account for heat build-up within susceptible electronic components. The technique uses linear coupling measurements made at the cable terminals which feed the subsystem. It, therefore, includes the effects of the external threat parameters, e.g., spectral intensity of frequency components, polarization, and incidence direction. Besides being useful for establishing electronic breakdown thresholds, the technique can be used for full system analysis to verify that the electronics can survive a real threat.

33624 **Thermal protection apparatus.** Bennett, G.A.; Moore, T.K. (to Dept. of Energy). US Patent Application 6-898,083. 20 Aug 1986. 13p. Contract W-7405-ENG-36. DE87007209 NTIS, PC A02/MF A01; GPO Dep. File Number DE87007209.

An apparatus for thermally protecting heat sensitive components of tools. The apparatus comprises a Dewar holding the heat sensitive components. The Dewar has spaced-apart inside walls, an open top end and a bottom end. A plug is located in the top end. The inside wall has portions defining an inside wall aperture located at the bottom of the Dewar and the outside wall has portions defining an outside wall aperture located at the bottom of the Dewar. A bottom connector has inside and outside components. The inside component sealably engages the inside wall aperture and the outside component sealably engages the outside wall aperture. The inside component is operatively connected to the heat sensitive components and to the outside component. The connections can be made with optical fibers or with electrically conducting wires.

4403 Miscellaneous Instruments

REFER ALSO TO CITATION(S) 32453, 32509, 32516, 32754, 32832, 33326, 33342, 33345, 33389, 33542, 33644, 33645, 34257

33625 **(DP-MS—86-69) Remote online process measurements by a fiber optic diode array spectrometer.** Van Hare, D.R.; Prather, W.S.; O'Rourke, P.E. (Savannah River Lab., Aiken, SC (USA)). 1986. Contract AC09-76SR00001. 9p. (CONF-8609260—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87005824.

From Federation of Analytical Chemistry and Spectroscopy Societies' annual meeting; St. Louis, MO, USA (28 Sep 1986).

The development of remote online monitors for radioactive process streams is an active research area at the Savannah River Laboratory (SRL). A remote offline spectrophotometric measurement system has been developed and used at the Savannah River Plant (SRP) for the past year to determine the plutonium concentration of process solution samples. The system consists of a commercial diode array spectrophotometer modified with fiber optic cables that allow the instrument to be located remotely from the measurement cell. Recently, a fiber optic multiplexer has been developed for this instrument, which allows online monitoring of five locations sequentially. The multiplexer uses a motorized micrometer to drive one of five sets of optical fibers into the optical path of the instrument. A sixth optical fiber is used as an external reference and eliminates the need to flush out process lines to re-reference the spectrophotometer. The fiber optic multiplexer has been installed in a process prototype facility to monitor uranium loading and breakthrough of ion exchange columns. The design of the fiber optic multiplexer is discussed and data from the prototype facility are presented to demonstrate the capabilities of the measurement system.

33626 (JINR—D-13-85-793, pp 123-126) **Specific features of organizing the computer-aided design of radio-electronic equipment for electrophysical facilities.** Mozin, I.V.; Vasil'ev, M.P. (Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad, USSR). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

Problems of developing systems for computer-aided design (CAD) of radioelectronic equipment for large electrophysical facilities such as charged particle accelerators of new generation are discussed. The PLATA subsystem representing a part of CAD and used for printed circuit design is described. The subsystem PLATA is utilized to design, on the average, up to 150 types of circuits a year, 100-120 of which belong to circuits of increased complexity. In this case labour productivity of a designer at documentation increases almost two times.

33627 (JINR—D-13-85-793, pp 127-131) **Standardized soft-and-hard ware complexed and modular equipment for physical investigation automation.** Astaf'ev, V.A.; Zdravomyslov, O.N. (Moskovskij Gosudarstvennyj Univ., USSR. Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki; Vsesoyuznoe Promyshlennoe Ob'edinenie po Proizvodstvu Ehlektroizmeritel'nykh Priborov Soyuzehlektropribor, Moscow, USSR). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

Main parameters of the IVK-20, IVK-6, IVK-9, IVK-10, IVK-16 and VK-F on-line measuring complexes are presented. The IVK-20 complex is intended for automation of scientific researches in different for automation of scientific researches in different fields of science and technique, it is constructed on the base on the on-line control complex SMP 1300.1701 and CAMAC crate; it can be used both independently and as a terminal complex in multimachine hierarchial systems. The IVK-6 is a problem-oriented complex intended for automation of general physical studied and engineering calculations and it can be a basis for development of multimachine hierarchial on-line measuring systems. It is based on the SM-4 computer and four IVK-20 complexes. The IVK-9 complex is based on the SM-4 computer and CAMAC crate and it is intended for automation of mechanical tests of materials and structures. The IVK-10 complex comprises an on-line control complex on the basis of the SM-1420 computer and CAMAC crates and it is intended for a muliparametric experiment with distributed objects. The IVK-16 includes the "ELEKTRONIKA-60" computer and one CAMAC crate; it can be used as a part of a local system of an automated experiment or as a lower level in a two-level system with increased noise protection. The VK-I is a problem-oriented complex for processing spectral data obtained by optical methods.

33628 (JINR—D-13-85-793, pp 206-208) **KZU-482 type combined memory device.** Belyakova, M.P.; Kim I En; Pak En Un. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

The KZU-482 combined memory of increased capacity intended for systems including the KKI-661 type crate-controller or other control blocks utilizing the dataway of Intel 8080 microprocessor is described. The module comprises reprogrammed memory of 8 kbyte and mass memory of 48 kbyte. Communication of the module with control blocks (crate controller, channel of direct access to memory) is realized by means of the CAMAC dataway. The considered module is utilized in an on-line control system of cryogenic helium facility and in a control device of the EC-1055M computer terminal.

33629 (JINR—D-13-85-793, pp 345-348) **Recording system for the LIDIA-M mass spectrometer.** Bogdanov, D.D.; Gorshkov, V.A.; Orlova, O.A.; Portil'o, R. del; Rodin, A.M.; Ter-Akopyan, G.M.; Chelnokov, L.P. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

Performances of the measuring system of the LIDIYa-M mass spectrometer are considered. The mass-spectrometer comprises a laser ion source, magnetooptical system, electric system for ion detection and system of high-vacuum pumping. The ion source produces pulse beams of 5-15 μs duration. The number of ions in a pulse attains 2 x 10/sup 9/. An assembly of two microchannel plates 34 mm in diameter with channel density of the order of 10/sup 6/ chan./cm/sup 2/ is utilized for measuring ion currents. The detector operates both in the regime of ion current integration and in the regime of single ion detection. The on-line measurement system is developed on the base of the MERA 60-30 microcomputer.

33630 (JINR—D-13-85-793, pp 394-397) **Multi-channel system for analog signals measuring with intermediate frequency conversion.** Korolev, V.S.; Parfenov, A.N.; Skron'ski, Ya.; Tlachala, V. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

A multi-channel system for measuring slowly-changing analog signals intended for operation under noise conditions is described. Measurement is carried out using the method of voltage to pulse repetition period conversion with following measuring this period.

33631 **(K/ETAC—13/S1) SEMMSS accelerometer mount transmissibility evaluation.** Andriulli, J.B. (Oak Ridge Gaseous Diffusion Plant, TN (USA); Oak Ridge National Lab., TN (USA)). May 1987. Contract AC05-84OR21400;AC05-84OT21400. 28p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87009976.

Two candidate accelerometer mount adhesives were tested for vibration transmissibility using the same fixture and procedures described previously. The transmissibility is normalized relative to the base-case threaded stud accelerometer mount, and these two adhesives are ranked with the four previously tested adhesives according to performance.

33632 **(MLM—3426) Preliminary Fabry Perot testing - 1986.** Benner, D.E. (Monsanto Research Corp., Miamisburg, OH (USA). Mound). 30 Apr 1987. Contract AC04-76DP00053. 15p. NTIS, PC A02. File Number DE87009248.

Fabry Perot interferometry is a method of determining instantaneous velocities of an object in motion. The interferometer system is composed of the Fabry Perot interferometer, a laser, an electronic streak camera, and several focusing lenses. The first tests discussed were done on exploding bridgewire devices. During these tests, several system parameters were changed. These changes did not seem to affect the data, which appeared to be consistent. The second tests performed focused on slapper-type devices. It was determined that sandblasted, vapor-deposited aluminum on the slapper material would be required to yield quality data. Streak camera failure prevented much data from being collected. An effort is being made to replace the current streak camera. After it is replaced, a Fabry Perot and velocity interferometry system for any reflector comparison will be made. The results will be published as the conclusion to this report.

33633 **(UCRL—93452) Design and component specifications for high average power laser optical systems.** O'Neil, R.W.; Sawicki, R.H.; Johnson, S.A.; Sweatt, W.C. (Lawrence Livermore National Lab., CA (USA); Sandia National Labs., Albuquerque, NM (USA)). Jan 1987. Contract W-7405-ENG-48;AC04-76DP00789. 37p. (CONF-860117—15). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87009136.

From Los Angeles symposium and exhibition on optical and electro-optical engineering; Los Angeles, CA, USA (19 Jan 1986).

Laser imaging and transport systems are considered in the regime where laser-induced damage and/or thermal distortion have significant design implications. System design and component specifications are discussed and quantified in terms of the net system transport efficiency and phase budget. Optical substrate materials, figure, surface roughness, coatings, and sizing are considered in the context of visible and near-ir optical systems that have been developed at Lawrence Livermore National Laboratory for laser isotope separation applications. In specific examples of general applicability, details of the bulk and/or surface absorption, peak and/or average power damage threshold, coating characteristics and function, substrate properties, or environmental factors will be shown to drive the component size, placement, and shape in high-power systems. To avoid overstressing commercial fabrication capabilities or component design specifications, procedures will be discussed for compensating for aberration buildup, using a few carefully placed adjustable mirrors. By coupling an aggressive measurements program on substrates and coatings to the design effort, an effective technique has been established to project high-power system performance realistically and, in the process, drive technology developments to improve performance or lower cost in large-scale laser optical systems. 13 refs.

33634 **Fiber-optic evanescent field absorption sensor.** Paul, P.H.; Kychakoff, G. (Department of Mechanical Engineering, Stanford University, Stanford, California 94305). *Applied Physics Letters;* **51**: No. 1, 12-14(6 Jul 1987).

Waveguide evanescent field absorption has been measured as a function of cladding refractive index and bulk absorption coefficient. A simple theory for interpreting these results has been developed. An all-fiber species concentration sensor has been constructed and its performance characterized.

33635 **Precision limits of waveform recovery and analysis in a signal processing oscilloscope.** Dowell, L.J.; Gillies, G.T.; Cates, M.R.; Allison, S.W. (Fundamental Measurements Group, Department of Nuclear Engineering and Engineering Physics, University of Virginia, Charlottesville, Virginia 22901). *Review of Scientific Instruments;* **58**: No. 7, 1245-1250(Jul 1987).

The precision limits of a waveform processing oscilloscope have been investigated for the situation where the instrument is used to recover a repetitive exponential signal from high levels of noise. In these studies, the oscilloscope was programmed to sample the signal, average it, and then calculate its exponential decay time constant. The measurement errors in the resulting time constants were found to decrease with continued averaging, but not without limit. In fact, we found that there was an optimum number of samples needed to minimize the error for any particular value of the signal-to-noise ratio at the input to the oscilloscope. We present here our empirically determined values of those optima, an intercomparison of them with the results of a theoretical model, and a description of the measurement system developed for this work.

33636 **Capacitance dilatometer for in situ measurement of radiation-induced dimensional changes of solids.** Tanimura, K.; Itoh, N.; Arima, K.; Imaike, H.; Heikkinen, D.W. (Department of Physics, Faculty of Science, Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464 Japan). *Review of Scientific Instruments;* **58**: No. 7, 1284-1286(Jul 1987).

We describe a new capacitance dilatometer for measuring radiation-induced volume change of solids having high stability and capability of measuring a fractional length change of 10^{-6}.

33637 **Molybdenum-silicon multilayer monochromator for the extreme ultraviolet.** Barbee, T.W. Jr.; Pianetta, P.; Redaelli, R.; Tatchyn, R.; Barbee, T.W. III. (Lawrence Livermore National Laboratory, Livermore, California 94550). *Applied Physics Letters;* **50**: No. 25, 1841-1843(22 Jun 1987). Contract W-7405-ENG-48.

A two-element molybdenum-silicon multilayer monochromator has been tested in the energy range 60—110 eV on a differentially pumped bending magnet beamline having a high-energy

cutoff of 3.5 keV at the Stanford Synchrotron Radiation Laboratory. The multilayer structures were sputter deposited onto 5-cm-diam (111) single-crystal silicon and contained 20 molybdenum layers (4.93 nm thick)= separated by amorphous silicon layers (7.8 nm thick). A 1200 l/mm gold transmission grating was used to independently measure the wavelength passed by the monochromator. The Al L/sub 2,3/ absorption edge jump was also measured using the monochromator. These experimental results are compared to model calculations for both the synchrotron source-monochromator and the synchrotron source-monochromator-Al filter configurations and excellent agreement is shown.

33638 **Generation of excess low frequency noise on an optical source.** Voigtman, E.; Winefordner, J.D. (Univ. of Florida, Gainesville). *Analytical Chemistry;* **59**: No. 9, 1364-1366(1 May 1987).

This paper addresses the problem of impressing an excess low frequency (ELF) noise on an optical source. The authors do not much care what the noise intensity is, in what domain the noise is originally generated, or precisely what the noise power spectral density is, so long as the noise is ELF noise, i.e., noise that is predominantly low frequency in character. Clearly, this task is easiest when the optical source is readily electrically modulatable, as is the case for continuous wave (CW) lasers, LEDs, and hollow cathode lamps. The authors demonstrate several simple ways to generate ELF noise on several optical sources.

33639 **High resolution, high rate x-ray spectrometer.** Goulding, F.S.; Landis, D.A. (to Dept. of Energy, Washington, DC). US Patent 4,658,216. 14 Apr 1987. Filed date 14 Jul 1983. vp.

A system is described for processing pulses generated in response to detected signals of differing magnitudes, the system comprising: a main channel pulse shaping means for generating a substantially symmetrical triangular main channel pulse in response to each detected signal. The main channel pulses have amplitudes proportional to the magnitudes of the detected signals, the main channel pulses each having a substantially constant pulse width; a fast channel pulse shaping means for generating a substantially symmetrical triangular fast channel pulse in response to each detected signal. The fast channel pulses each have a substantially constant pulse width which is substantially independent of the magnitudes of the detected signals and which is substantially less than the pulse width of the main channel pulses; and output means for receiving the main channel pulses and for generating output pulses corresponding to the main channel pulses, with the amplitudes of the output pulses being proportional to the amplitude of the main channel pulses to which they correspond.

33640 **Analytical instrument with apparatus and method for sample concentrating.** Zaromb, S. (to Dept. of Energy). US Patent Application 6-892,990. 4 Aug 1986. 18p. Contract W-31109-ENG-38. DE87007203 NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87007203.

A system for analysis of trace concentrations of contaminants in air includes a portable liquid chromatograph and a preconcentrator for the contaminants to be analyzed. The preconcentrator includes a sample bag having an inlet valve and an outlet valve for collecting an air sample. When the sample is collected the sample bag is connected in series with a sorbing apparatus in a recirculation loop. The sorbing apparatus has an inner gas-permeable container containing a sorbent material and an outer gas-impermeable container. The sample is circulated through the outer container and around the inner container for trapping and preconcentrating the contaminants in the sorbent material. The sorbent material may be a liquid having the same composition as the mobile phase of the chromatograph for direct injection thereinto. Alternatively, the sorbent material may be a porous, solid body, to which mobile phase liquid is added after preconcentration of the contaminants for dissolving the contaminants, the liquid solution then being withdrawn for injection into the chromatograph.

33641 **Portable system and method combining chromatography and array of electrochemical sensors.** Zaromb, S.; Stetter, J.R. (to Dept. of Energy). US Patent Application 6-881,310. 2 Jul 1986. 53p. Contract W-31109-ENG-38. DE87007193 NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87007193.

A portable system for analyzing a fluid sample includes a small, portable, low-pressure and low-power chromatographic analyzer and a chemical parameter spectrometry monitor including an array of sensors for detecting, identifying and measuring the concentrations of a variety of components in the eluent from the chromatographic analyzer. The monitor includes one or more operating condition controllers which may be used to change one or more of the operating conditions during exposure of the sensors to the eluent from the chromatography analyzer to form a response pattern which is then compared with a library of previously established patterns. Gas and liquid chromatographic embodiments are disclosed. In the gas embodiment, the operating condition controllers include heated filaments which may convert electrochemically inactive components to electrochemically active products. In the liquid chromatography embodiment, low-power, liquid-phase equivalents of heated filaments are used with appropriate sensors. The library response patterns may be divided into subsets and the formed pattern may be assigned for comparison only with the patterns of a particular subset.

33642 **Time-resolved x-ray scattering instrumentation.** Borso, C.S. (to Dept. of Energy). US Patent Application 6-800,563. 21 Nov 1985. 16p. Contract W-31-109-ENG-38. DE87007274 NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87007274.

An apparatus and method for increased speed and efficiency of data compilation and analysis in real time is presented in this disclosure. Data is sensed and grouped in combinations in accordance with predetermined logic. The combinations are grouped so that a simplified reduced signal results, such as pairwise summing of data values having offsetting algebraic signs, thereby reducing the magnitude of the net pair sum. Bit storage requirements are reduced and speed of data compilation and analysis is increased by manipulation of shorter bit length data values, making real time evaluation possible.

45 EXPLOSIONS AND EXPLOSIVES

4501 Chemical

REFER ALSO TO CITATION(S) 33215, 33325

33643 **(LA-UR—87-1786) Molecular models for explosives.** Ritchie, J.P.; Bachrach, S.M. (Los Alamos National Lab., NM (USA)). 1987. Contract W-7405-ENG-36. 19p. (CONF-8705106—2). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010136.

From International workshop on micro and macroscopic approaches to detonation; Megeve, France (31 May 1987).

Any fundamental understanding of detonations and explosives' behavior requires as a starting point a knowledge of molecular properties. Indeed, there is a sizable literature concerning observed decomposition kinetics, x-ray crystal structures, heats of formation, etc. for explosives. As a result of this extensive experimental work, a large and ever increasing number of observed properties of explosives are available. Given sufficient data, models for the prediction of molecular properties can be developed and calibrated. Nevertheless, many desirable molecular properties can be obtained with considerable effort and, in many cases, experimental measurements are not possible for practical reasons; e.g., bond dissociation energies are very difficult to obtain for explosives. Consequently, theoretical methods for obtaining these properties are quite desirable. In addition, it is oftentimes desired to estimate the properties of unknown molecules. Consequently, methods for the estimation of molecular properties, which might seem quite crude by other standards, can be of considerable practical value. We present in this paper some of our recent efforts at extending and developing molecular models for explosives. These efforts fall into three main

areas: Estimation of crystal densities of organic nitrates and perchlorates by an entirely empirical group additivity method; calculation of molecular heats of formation and bond dissociation energies (BDE's) by a semi-empirical molecular orbital method (AM1); and the electronic structure of nitrobenzene as obtained from non-empirical (sometimes called ab initio molecular orbital calculations. 10 refs.

33644 **(MLM—3422) A second automated system for measuring the thermal response of the 3Y subassembly.** Rodenburg, W.W.; Mayer, R.L. II, Wiedenheft, C.J.; Shockey, G.C.; Nelson, C.C. Jr. (Monsanto Research Corp., Miamisburg, OH (USA). Mound). 15 Apr 1987. Contract AC04-76DP00053. 71p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87009388.

A second calorimeter system has been developed to measure the thermal output of a 3Y subassembly and to monitor the surface temperature of the unit on ignition. This new calorimeter system consists of a modified Parr Instruments No. 1241 adiabatic calorimeter, a specialized reaction vessel, a Hewlett Packard data acquisition system, and software developed at Mound. The system differs from the first one developed in that it contains a different scanner, the heater currents are switched by an external relay, and the insert was modified to improve and simplify operation of the system. Several modifications were also made to the software to provide additional information. This report covers the differences between the two systems, the initial testing of the second system, and the procedures for operating the second system.

33645 **(MLM—3434(OP)) A microcalorimeter used to detect changes in aged energetic materials.** Wiedenheft, C.J.; Rodenburg, W.W.; Shockey, G.C. (Monsanto Research Corp., Miamisburg, OH (USA). Mound). 1987. Contract AC04-76DP00053. 4p. (CONF-870482—5). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009201.

From 14. Department of Energy compatibility, aging and service life conference; Amarillo, TX, USA (28 Apr 1987).

To ensure the quality of chemical explosives, analytical tests are performed on the materials. One of the most fundamental measurements is that of heat released during an exothermic reaction. Because only small amounts, less than 20 mg, of explosive material can be removed from most weapons, special techniques and instruments must be used to measure a heat output of a few tens of calories. The calorimeter described in this report consists of a sample side and a reference side placed in a constant temperature bath. The calorimeter and sample are heated by passing the current from a bank of capacitors through a heating wire. In order to measure the temperature change, the resistance of Ni wire is measured. The unit was calibrated and found to be accurate for reactions with greater than 5 calories of heat output. (JDH)

33646 **(SAND—86-1651C) Thermal ignition of Ti-based pyrotechnics I: Ti oxidation mechanism and kinetics.** Rogers, J.W. Jr.; Erickson, K.L. (Sandia National Labs., Albuquerque, NM (USA)). 1987. Contract AC04-76DP00789. 6p. (CONF-870668—2). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87005843.

From 3. international conference of the Groupe de Travail de Pyrotechnic Spatiale and 12. international pyrotechnics seminar; Paris, France (8 Jun 1987).

In an effort to model the ignition process oxidation experiments have been performed at low temperature and the oxidation and diffusion behavior studied. Single crystal Ti was used in order to rule out any contributions to the oxidation and diffusion mechanism from grain boundaries. Single crystals of Ti(0001) were polished, thoroughly rinsed in acetone, and ion sputtered until Auger analysis revealed no detectable surface contaminants. The Ti samples were oxidized in oxygen ambients of 3 to 700 Torr, at sample temperatures from 373 to 773 K, for periods from 1 to 100 hours. Concentration ratios versus time were determined from the O(KVV)/Ti(LMV) Auger peak area ratios.

33647 **(SAND—87-0883C) Spectroscopic studies of initiation and detonation chemistry.** Renlund, A.M.; Trott, W.M. (Sandia National Labs., Albuquerque, NM (USA)). 1987. Contract AC04-76DP00789. 12p. (CONF-8705106—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009836.

From International workshop on micro and macroscopic approaches to detonation; Megeve, France (31 May 1987).

There is much effort currently directed towards elucidating important microscopic processes in reacting high explosives (HEs). In particular, identification of early chemical steps in initiation is crucial to a better understanding of explosive sensitivity and vulnerability. The intimate coupling of the chemical work required to sustain detonation with the mechanical properties of the material and the resulting wave motion drives experimental studies to focus on realistic cases of initiation and steady-state detonation. Extrapolation of results from more homogeneous pressure and temperature domains may provide an inadequate description of the physics and chemistry involved. In practice the study of molecular properties in the extreme environment of detonation requires fast detection of transient phenomena. Over the past few years, the investigators have applied various optical techniques to studies of molecular mechanisms of initiation and detonation. The main focus has been to study reactions in compressed granular HEs like those commonly used in weapon components. Four experimental techniques were used: emission spectroscopy; fast-framing photography; time-resolved infrared spectral photography (TRISP); and single-pulse Raman spectroscopy. In this paper the investigators describe; (1) use of fast-framing photography and emission spectroscopy to study spatial and temporal character of emitted light from detonating HEs; (2) use of TRISP technique to monitor formation of water from various detonating HEs; and (3) use of single-pulse Raman scattering to study changes in shocked TATB. 11 refs., 5 figs.

4502 Nuclear

REFER ALSO TO CITATION(S) 33387, 33680, 33682, 33683

33648 **(AD-A—177654/1/XAB) Spectral methods for global atmospheric flow applied to the modified AFIT (Air Force Institute of Technology) fallout prediction model. Master's thesis.** Palmer, D.L. (Air Force Inst. of Tech., Wright-Patterson AFB, OH (USA). School of Engineering). Sep 1986. 129p. (AFIT/GNE/PH—86M-14). NTIS, PC A07/MF A01.

This thesis predicted the airborne spatial distribution of a high-explosive-generated dust cloud. A comparison of predicted cloud center positions to experimental data collected from an aircraft flying through the dust cloud center at various times and altitudes was also studied. The analysis was accomplished using a model called AFGL which produces global complex spectral coefficients. Spectral coefficients were applied as inp fallout prediction model (called REDRAM) to predict dust mass/cu. m.

4503 Explosion Detection

33649 **(UCID—20945) High-frequency observations of signals and noise near RSON: implications for the discrimination of ripple-fired mining blasts.** Smith, A.T.; Grose, R.D. (Lawrence Livermore National Lab., CA (USA); California Univ., Berkeley (USA)). 27 Apr 1987. Contract W-7405-ENG-48. 128p. NTIS, PC A07/MF A01; 1; GPO Dep. File Number DE87009796.

Discrimination of large chemical explosions from possible clandestine nuclear tests is a significant issue for seismic verification. Unless discrimination is possible, the numerous mining blasts within the USSR would give ample opportunity for concealing a clandestine test. Evernden et al. (1986) advocate high frequencies as a means to detect these clandestine tests; however, mining blasts must still give a unique signature for their discrimination. Specific conditions are also necessary for high-frequency verification: low attenuation and quiet seismic stations are among the most important. In this study we address these problems under conditions representing a best case scenerio. During the summer of 1985, LLNL

deployed a regional array and high-frequency station near RSON (Red Lake, Ontario, Canada) to study regional seismic signals at a low-noise site with excellent propagation characteristics, the continental shield. One objective was to evaluate the performance of regional seismic arrays and high-frequency stations in this geological environment. Using high-frequency data from mining blasts within the Masabi Iron Range in northern Minnesota (distance of 400 km), we observed the high-frequency P/sub n/ phase of ripple-fired blasts, modelled their source properties, and evaluated a possible discriminant for chemical explosions. This study suggests the existence of a distinctive signature for large chemical explosions: strong, high-frequency spectral peaks in the P spectra introduced by delay shooting or ripple-firing. Its application depends, however, on a frequency band extending to at least 35 Hz at regional distances and predictably quiet seismic sites.

33650 **(UCID—21049) Seismic noise spectra at Elko, Kanab, Landers, and Mina.** Rodgers, P.W.; Rohrer, R.F. (Lawrence Livermore National Lab., CA (USA)). 22 Apr 1987. Contract W-7405-ENG-48. 37p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87009694.

The ambient seismic noise at the four Digital Seismic Stations (DSS) operated by the Lawrence Livermore National Laboratory is computed for four 500-second time windows: summer daytime, summer nighttime, winter daytime and winter nighttime. In terms of the averages over these windows, in the seismically important 1 to 10 Hz band, the order of the DSS stations in quietness is Elko<Landers<Kanab<Mina. For a one-octave bandwidth, the average peak-peak displacements in nm at 1 Hz are: Elko 0.82 nm, Landers 0.90 nm, Kanab 0.95nm, Mina 1.8 nm. These spectral noise data show larger than usual slope increases beginning at 1 Hz, particularly, at Mina. These slope changes are not due to DSS system noise which is 14 db below the average station noise. No physical explanation for these slope changes was forthcoming in the data. Comparing these DSS noise spectra in the 1.5 - 10 Hz band with Regional Seismic Test Network (RSTN) data from the stations RSNT and RSNY shows that in terms of averages: RSNT<Elko<RSNY<Mina. The average peak-peak displacements in nm for a one-octave bandwidth at 1 Hz are: RSNT 0.6 nm, RSNY 2.7 nm.

50 ENVIRONMENTAL SCIENCES, ATMOSPHERIC

5001 Basic Studies

REFER ALSO TO CITATION(S) 34226

33651 (CONF-8510249—Vol.2, pp 1065-1074) **Interactive snowcover mapping with geostationary satellite data over the western United States.** Allen, M.W.; Mosher, F.R. (National Severe Storms Forecast Center, Kansas City, MO). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

While digital snow mapping from geostationary satellite data has been conducted by the National Environmental Satellite Data and Information Service (NESDIS) since 1981, the products have limited accuracy because they utilize four kilometer visible data. This paper describes an operational digital interactive snowmapping process utilizing one kilometer visible GOES data which has been initiated by the Satellite Field Service Station (SFSS) of the National Severe Storms Forecast Center (NSSFC). As part of the NSSFC effort at severe storm forecasting, real time full resolution GOES data is received directly from the satellite by the Centralized Storm Information System (CSIS) and used at interactive terminals for operational severe weather forecasting. A spin-off of this data base and interactive processing capability has been the utilization of this capability by the SFSS satellite hydrologist for snowmapping in the Western US. Prior efforts by the SFSS hydrologist utilizing NESDIS reduced resolution visible data resulted in the operational snowmapping of 16 basins. Using CSIS capabilities these 16 basins were subdivided into 68 US Geological Survey (USGS) hydrologic catalog units, and service is being expanded to include additional areas. Catalog units being mapped range in size from 800 to 12,000 sq km. 2 references, 2 figures.

33652 (CONF-8510249—Vol.2, pp 1075-1086) **Sensing the spatial character of storms for hydrologic applications.** Engdahl, T.L.; Collins, J.G. (USAE Waterways Experiment Station, Vicksburg, MS). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

An isolated convective storm occurring on 26 April 1984 was tracked as it moved over eastern Louisiana and central Mississippi. National Weather Service (NWS) rain gage data were obtained at 56 locations within a 120-nautical mile radius of the Jackson, MS, NWS radar site; total storm rainfalls were mathematically distributed over the area using an accepted procedure. Radar estimated rainfalls were also obtained. Comparisons of area average rainfalls and rainfalls observed at gage sites indicated satisfactory agreement. Three-dimensional plots and quantitative analyses of radar data demonstrate extreme areal variability in storm rainfall. Results reinforce the conclusion that a blind mathematical extrapolation of gage-measured rainfall is an unsound practice. At present, only the weather radar can provide a distributed rainfall data suitable for hydrologic forecasting over small areas. 8 references, 6 figures, 2 tables.

5002 Chemicals Monitoring And Transport

REFER ALSO TO CITATION(S) 32448, 32456, 32466, 32467, 32495, 33129, 33130, 33131, 33678, 33681, 33943, 33949, 33951

33653 **(BNL—39666) Mobile laboratory van.** Leahy, D.F.; Spandau, D.J. (Brookhaven National Lab., Upton, NY (USA)). Mar 1987. Contract AC02-76CH00016. 32p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87010453.

A Shasta motor home has been modified to serve as a mobile research vehicle for field operations. This report gives specifications and suggested uses for this platform. Instrumentation for air pollution monitoring is included.

33654 **(CONF-8510250—) Proceedings of the forest-atmosphere interaction workshop.** (USDOE Office of Energy Research, Washington, DC. Office of Health and Environmental Research). May 1987. 247p. NTIS, PC A11; 3; GPO Dep. File Number DE87009894.

From Department of Energy (DOE) meterology workshop; Lake Placid, NY, USA (1 Oct 1985).

The papers presented in this volume cover many of the potential causes of forest decline. In addition, attention is devoted to methods of detecting changes in forest growth such as remote sensing techniques and biochemical indications. The workshop was divided into three main sections: (1) Forest Science and Management; (2) Atmosphere Canopy Exchange; and (3) Biomass Decline. Following the presentation of all of the papers, attendees were assigned to three panel discussion groups - one for each section. The panels met concurrently to discuss the respective research needs and to develop recommendations for research. The objectives of the workshop, as paraphrased from the enclosed agenda were: (1) to discuss problem areas and identify new issues concerning forest-atmosphere interactions; (2) to provide information exchange; and (3) to provide recommendations for research.

33655 **(ESC—40) Energy and the greenhouse effect; in all weathers.** Okken, P.A. (Stichting Energieonderzoek Centrum Nederland, Petten. Energie Studie Centrum). Mar 1987. 157p. (In Dutch). NTIS (US Sales Only), PC A08/MF A01. File Number DE87752321.

The increased amount of carbon dioxide in the atmosphere causes a global raise of the earth temperature, due to the 'greenhouse effect'. The magnitude of the resulting global warming is yet uncertain. It is not clear how much carbon dioxide remains in the atmosphere. Carbon dioxide takes part in the global carbon cycle, it is removed from the atmosphere by absorption in seawater and photosynthesis in vegetation. The future anthropogenic carbon dioxide release is uncertain. World development, energy-use, energy sources, carbon dioxide removing technologies, land-use patterns and deforesteration are important parameters. Besides carbon diox-

ide other anthropogenic gases in the atmosphere also trap infrared radiation. Their joint effect may become of the same order of magnitude as the carbon dioxide greenhouse effect. Global warming from carbon dioxide and other greenhouse gases will have effect on climate and society. Atmospheric and ocean circulation patterns might change. Climate zones will move polewards. Sea levels will rise. Agriculture will change. Human health and welfare may be affected. A review is given of the current state of knowledge on the greenhouse issue from an energy research policy point of view. Because of the wide range of uncertainty four different greenhouse scenario's are made for the next century. Global warming, sea level rise and agricultural productivity change are quantified in these scenario's for the year 2087. Policy may stop an irreversible greenhouse effect. On the other hand scientific controverses and international disagreement may prevent policy. In conclusion a statement is made on the greenhouse issue in energy policy and energy scenario's. Also recommendations for further scientific and interdisciplinary research are given.

33656 **(PB—87-161170/XAB) Study estimating VOC (volatile organic compound) emissions from the Calumet Sewage Treatment Plant in the Chicago area.** Namkung, E.; Rittmann, B.E. (Rittmann (Bruce E.) and Associates, Urbana, IL (USA)). Dec 1986. 38p. NTIS, PC A03/MF A01.

The emission of volatile organic compounds (VOCs) from Publicly Owned Sewage Treatment Works (POTWs) might pose an air-pollution hazard, because many VOCs are known to create a human health hazard with continuous exposure. This study estimated the annual emission rates of individual and total VOCs from the Calumet Sewage Treatment Plant (STP), which is one of the treatment works of the Metropolitan Sanitary District of Greater Chicago (MSDGC) most likely to emit significant amounts of VOCs.

33657 **(PB—87-169603/XAB) Kraft pulp industry particulate emissions: source category report. Final report, June 1984-August 1986.** Modetz, H.; Murtiff, M. (Acurex Corp., Mountain View, CA (USA). Environmental Systems Div.). Feb 1987. 133p. NTIS, PC A07/MF A01.

The report gives results of the development of particulate emission factors based on cutoff size for inhalable particles for the kraft pulp industry. After a review of available information characterizing particulate emissions from kraft pulp mills, the data were summarized and rated in terms of reliability. Size-specific emission factors were developed from these data for the major processes used in the manufacture of kraft pulp. A detailed process description is presented with emphasis on factors affecting the generation of emissions. A replacement for Section 10.1 (Chemical Wood Pulping) of EPA report AP-42, a Compilation of Air Pollutant Emissions Factors, was prepared, containing the size-specific emission factors developed during this program.

33658 **Natural and anthropogenic perturbations to the stratosphere.** Wuebbles, D.J. (Lawrence Livermore National Laboratory, University of California, Livermore, California 94550). *Reviews of Geophysics and Space Physics;* **25**: No. 3, 487-493(Apr 1987).

This review describes the research progress made during the last four years concerning natural and anthropogenic perturbations to the stratosphere. Observed trends in ozone and temperature, along with other available measurements, are discussed and compared with theoretical model calculated analyses of perturbation effects.

33659 **Temporal trends of the stable carbon isotopic composition of atmospheric CH_4.** Stevens, C.M. (Argonne National Lab., IL). pp vp of 193rd American Chemical Society national meeting. Washington, DC; American Chemical Society (1987). (CONF-870410—). Contract W-31-109-ENG-38.

From 193. national meeting of the American Chemical Society; Denver, CO, USA (5 Apr 1987).

The carbon-13 isotopic composition, δC, of the various natural and anthropogenic sources of atmospheric CH_4 vary over a wide range from $\delta C = -25$ to -70 per thousand. The temporal changes in the isotopic composition of atmospheric CH_4 reflect any changes in the relative distribution of the flux strengths of the isotopically different sources such as CH_4 emissions from biomass burning, fossil fuel mining, rice paddies, as well as the possible variations in the fluxes from natural sources of different isotopic composition. Results are presented for the long term trends shown by comparing the isotopic composition of CH_4 of air contained in 100-350 year old ice cores, with that of contemporary atmospheric CH_4, and short-term trends in the isotopic composition of atmospheric CH_4 since 1978 in both hemispheres. The interpretation of these results will be discussed.

33660 **Climatological variability in the evaluation of cost effectiveness of emission control strategies to reduce acid deposition.** Shannon, J.D.; Streets, D.G. (Argonne National Lab., IL). pp 33-44 of Air pollution modeling and its application V. De Wispelaere, C.; Schiermeier, F.A.; Gillani, N.V. (eds.). New York, NY; Plenum Press (1986).

An emission reduction strategy that assigns a specific contribution to each state (as, for example, contained in most bills introduced into the US Congress in the last four years) would be expected to be relatively insensitive to climatological variability, in the sense that the achievement of a particular deposition level is not a prescribed goal of the strategy. In this case, it is straightforward to examine the interannual deposition variation at a particular receptor location that would accompany a fixed pattern of emission reductions. Consider, however, a strategy optimized to achieve a particular deposition goal at a particular receptor location. In this case, sites for emission reductions are chosen to take advantage of a set of precipitation and wind conditions and to maximize the deposition reduction achieved per unit emission reduction or per unit control cost. Such strategies might be expected to be quite susceptible to climatological variations. Conceptually, this susceptibility could be manifested in two ways: 1) a strategy designed to achieve a particular deposition goal using one set of meteorological data might be distinctly different from a strategy designed to achieve the same deposition goal using a different set of meteorological data; or 2) a strategy designed to achieve a particular deposition goal using one set of meteorological data might not achieve that goal in years when the meteorology is markedly different. It is the purpose of this paper to examine some of these questions. In particular, the authors evaluate the variations in emission reductions and control costs that derive from the sensitivity of cost-effective control strategies to climatological variability.

33661 **Technical uncertainty in quantitative policy analysis - a sulfur air pollution example.** Morgan, M.G.; Morris, S.C.; Henrion, M.; Amaral, D.A.L.; Rish, W.R. (Carnegie-Mellon Univ., Pittsburgh, PA). pp 61-82 of Air pollution modeling and its application V. De Wispelaere, C.; Schiermeier, F.A.; Gillani, N.V. (eds.). New York, NY; Plenum Press (1986).

Expert judgments expressed as subjective probability distributions provide an appropriate means of incorporating technical uncertainty in some quantitative policy studies. Judgments and distributions obtained from several experts allow one to explore the extent to which the conclusions reached in such a study depend on which expert one talks to. For the case of sulfur air pollution from coal-fired power plants, estimates of sulfur mass balance as a function of plume flight time are shown to vary little across the range of opinions of leading atmospheric scientists while estimates of possible health impacts are shown to vary widely across the range of opinions of leading scientists in air pollution health effects.

33662 **Regional air quality model assessment and evaluation.** Bhumralkar, C.M. (SRI International, Menlo Park, CA). pp 483-500 of Air pollution modeling and its application V. De Wispelaere, C.; Schiermeier, F.A.; Gillani, N.V. (eds.). New York, NY; Plenum Press (1986).

This paper summarizes the results of a study that was undertaken jointly by SRI International, Argonne National Laboratory, and TRC Environmental Consultants for the Electric Power Research Institute. The three models that were chosen for assessment are: RTM-II (Stewart et al. 1983), which represents the Eulerian class of models, but includes a Lagrangian module for treating the initial phases of dispersion from major point sources; ENAMAP-2

(Endlich, 1984), a source-oriented Lagrangian model that uses multi-layered, gridded wind fields for trajectory calculations; and ACID (Samson et al., 1982), a receptor-oriented, backward trajectory model. The model evaluation process involved five steps. The models and the modules within the models underwent a subjective evaluation of the degree to which the treatments were consistent with the physics of the processes. Observational data bases were examined and compiled; the EPRI SURE data base (Mueller and Hidy, 1983) served as the major source of observational data. The models were installed and operated at Argonne National Laboratory for multi-week periods in each of four seasons. The model calculations were compared with observed data, and various statistical performance measures were calculated. The evaluation results were summarized and interpreted.

33663 **Evaluation of source strength and dispersion model predictions with data from large nitrogen tetroxide field experiments.** McRae, T.G. (Lawrence Livermore National Lab., CA). pp 685-706 of Air pollution modeling and its application V. De Wispelaere, C.; Schiermeier, F.A.; Gillani, N.V. (eds.). New York, NY; Plenum Press (1986).

During the fall of 1983, the Lawrence Livermore National Laboratory (LLNL) conducted a series of large-scale (3-5 m^3) nitrogen tetroxide (N_2O_4) spill tests for the US Air Force Engineering and Services Laboratory, Tyndall AFB. The spill material was a rocket fuel oxidizer used in Titan II missile system. The purpose of the test series was to determine the source strength characteristics and heavy-gas dispersion aspects of large N_2O_4 spills. In addition, two spills were performed for the purpose of evaluating a Portable Foam Vapor Suppression System (PFVSS). The PFVSS tests were under the direction of the Ogden Air Logistics Center, Hill AFB, with support from USAF Space Division and the Strategic Air Command. The tests were performed at the US Department of Energy Nevada Test Site (NTS) under the jurisdiction of the DOE Nevada Operations Office (NVO). The N_2O_4 tests were the fifth in a continuing program of hazardous material spill tests conducted by LLNL and were code-named the Eagle series. In this work the source strength and downwind dispersion results of two of the spill tests (Eagle 3, Eagle 6) are used to evaluate several source strength and Gaussian dispersion models.

33664 **Study of heavy gas effects on the atmospheric dispersion of dense gases.** Ermak, D.L.; Chan, S.T. (Lawrence Livermore National Lab., CA). pp 723-742 of Air pollution modeling and its application V. De Wispelaere, C.; Schiermeier, F.A.; Gillani, N.V. (eds.). New York, NY; Plenum Press (1986). Contract W-7405-ENG-48.

In this paper, the authors compare four different types of dispersion simulations with the results from three heavy gas dispersion experiments. The experiments include two different release gases (LNG vapor, a cold dense gas and NO_2, an isothermal dense gas) and three different wind speeds and atmospheric stabilities. The four types of dispersion simulations are a heavy gas simulation, a neutrally buoyant gas simulation, and two types of trace gas simulations. They use two models (FEM3 and Steady-State SLAB) to make the predictions. FEM3 simulates the dispersion of the released gas by solving the time-dependent, three-dimensional conservation equations of mass, momentum, energy and species. Steady-state SLAB is based on the cross-wind averaged form of the conservation equations and uses similarity profiles to determine the cross-wind dependence. The purpose of this paper is to demonstrate how the inclusion of heavy gas phenomena and the choice in concentration averaging time affect the concentration prediction from a heavy gas release.

5003 Radioactive Materials Monitoring And Transport

REFER ALSO TO CITATION(S) 32507, 32587, 32588, 32826, 32916, 33022, 33108, 33721, 33752

33665 **(ANL/EES-TM—331) Review of radiological surveys of the General Services Administration's Raritan Depot in Edison, New Jersey.** Herzenberg, C.L.; Winter, R.C. (Argonne National Lab., IL (USA)). Oct 1986. Contract W-31109-ENG-38. 14p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009995.

This report reviews two recent radiological surveys of the General Services Administration (GSA) Raritan Depot in Edison, New Jersey, that were conducted after somewhat elevated levels of radiation were detected within a depot building. The first survey indicated gamma radiation levels were higher than natural background levels in some buildings and identified the probable source of the radiation as gypsum-like building tiles that contained natural uranium-chain radionuclides at a level 20 times higher than other materials. Elevated levels of radon and radon decay products also were detected in some buildings. A follow-on survey was conducted to confirm the January measurements and to measure radiation levels at other locations: additional buildings at the depot, buildings on the Middlesex County College campus, and a possible outdoor disposal site. EPA measurements established that ceiling material is the primary source of the radiation. Radioisotope analysis of the ceiling tile material from buildings with elevated radiation levels showed the presence of radium-226 at levels of approximately 25 picocuries per gram (pCi/g); this material would thus have to be treated as hazardous waste, should it be removed. This report critiques the methodology and results of the two surveys and recommends further action.

33666 (CONF-860932—, pp 79-84) **History of aerial surveys in response to radiological incidents and accidents.** Jobst, J.E. (EG & G Energy Measurements, Inc., Las Vegas, NV). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

EG & G Energy Measurements Inc., operates the Remote Sensing Laboratory for the US Department of Energy (DOE). The laboratory plays a key role in the federal response to a radiological incident or accident. It assists the DOE in the establishment of a Federal Radiological Monitoring and Assessment Center (FRMAC). The Remote Sensing Laboratory has played a major role in more than 14 incidents, including lost sources, accidental dispersions, and nuclear reactor incidents.

33667 (CONF-860932—, pp 85-89) **Status of aerial survey emergency preparedness and ground support equipment, calibration, and sensitivities.** Dahlstrom, T.S. (EG & G Energy Measurements, Inc., Las Vegas, NV). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

During the course of EG & G Energy Measurements, Inc. history in aerial surveillance, the scope of response has broadened from routine surveys and accident response with aerial systems, to being prepared to respond to any radiological incident with aerial, ground mobile, and hand-held instrumentation. The aerial survey system presently consists of four MBB BO-105 helicopters outfitted with gamma pods and specialized navigation systems (MRS or URS) that allow the operator and pilot to fly well-defined survey lines. Minimum detectable activities (MDA) for various isotopes range from a few tenths of a mCi to 100 mCI for point sources and from 1 to 200 pCi/g for volume sources.

33668 (CONF-860932—, pp 91-94) **Aerial systems support for Nevada Test Site weapons testing.** Boyns, P.K. (EG & G Energy Measurements, Inc., Las Vegas, NV). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

EG & G Energy Measurements, Inc. operates two aircraft for the Department of Energy in support of the Nevada Test Site (NTS) activities. A King Air B-200 and a Turbo Beech aircraft are used to perform wind measurements, cloud sampling and cloud tracking operations in support of each test.

33669 (CONF-860932—, pp 113-117) **New method for presenting off-site radiological monitoring data during emergency preparedness exercises.** Moeller, M.P.; Martin, G.F.; Hickey, E.E.; Jamison, J.D. (Pacific Northwest Lab., Richland, WA). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

As scenarios for exercises become more complicated and flexible to challenge emergency response personnel, improved means of presenting data must be developed to meet this need. To provide maximum realism and free play during an exercise, staff at the Pacific Northwest Laboratory (PNL) have recently devised a simple method of presenting realistic radiological field monitoring information for a range of possible releases. The method utilizes only two pieces of paper. The first is a map of the offsite area showing the shape of the plume for the duration of the exercise. The second is a semi-log graph containing curves relating exposure rate and iodine concentration to downwind distance and time. Several techniques are used to maximize the information on the graph.

33670 (CONF-860932—, pp 119-121) **Enhancement of the 1985 Browns Ferry exercise through the use of spiked samples.** McNees, J.L. (Alabama Dept. of Public Health, Montgomery). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

The use of spiked environmental samples has proven to be a beneficial part of nuclear power plant exercises. Milk, soil, and air sampling cartridges can easily be spiked with realistic concentrations of radionuclide without violating Nuclear Regulatory Commission regulations or policy and with no significant radiation hazard to exercise participants. Analysis and reporting of data from realistic samples significantly improves motivation, attitude, moral, and overall preparedness of the individuals participating in that phase of the exercise.

33671 (CONF-860932—, pp 131-134) **Mobile laboratory for near-real-time response to radioactive releases.** Sigg, R.A. (Savannah River Lab., Aiken, SC). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

A mobile laboratory is improving radiological emergency response and environmental monitoring capabilities at the Savannah River Plant. The laboratory can monitor low concentration levels of radionuclides and can rapidly confirm the location and radionuclide composition of a downwind plume. The analysis system developed for the laboratory includes radionuclide-specific monitors for tritium forms (HT and HTO), gamma-ray emitting aerosols, volatile radioiodine, transuranic aerosols, and noble gases. The monitors can detect radionuclides transported by the atmosphere to offsite population centers at concentrations well below those considered hazardous. An analyzer for a passive chemical tracer gas (sulfur hexafluoride, SF_6) also is onboard. The diverse instruments, their good sensitivity and fast response, and the ability to operate while in transit, make this a unique laboratory.

33672 (CONF-860932—, pp 135-136) **Improving emergency response through field exercises.** Addis, R.P.; Kurzeja, R.J.; Weber, A.H. (Savannah River Lab., Aiken, SC). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

Exercises using a tracer gas to simulate the accidental release of gaseous effluent to the atmosphere have been conducted at the Savannah River Plant since 1983. Although the tracer released is a passive gas, the operations are similar to those required for unplanned releases of radionuclides. These exercises, called Mesoscale Atmospheric Transport Studies (MATS), have produced many tangible benefits, including efficient, dependable performance of sampling teams, refinement and documentation of required skills and logistics, and better wind forecasting. The exercises have provided data required to evaluate the performance of dispersion models, and identified areas requiring improvement. For example, the operational Gaussian model was found to accurately predict puff centerline and puff width, but to over-predict the maximum concentration. The relative merits of moving samplers versus stationary samplers under various atmospheric conditions are also discussed.

33673 (CONF-860932—, pp 137-139) **Savannah River Plant remote environmental monitoring system.** Schubert, J.F. (Savannah River Lab., Aiken, SC). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

The SRP remote environmental monitoring system consists of separations facilities stack monitors, production reactor stack monitors, twelve site perimeter monitors, river and stream monitors, a geostationary operational environmental satellite (GOES) data link, reactor cooling lake thermal monitors, meteorological tower system, Weather Information and Display (WIND) system computer, and the VANTAGE data base management system. The remote environmental monitoring system when fully implemented will provide automatic monitoring of key stack releases and automatic inclusion of these source terms in the emergency response codes.

33674 (DOE/BP—717) **Radon monitoring results from BPA's residential weatherization program: Report No. 4.** (USDOE Bonneville Power Administration, Portland, OR). Oct 1986. 18p. NTIS, PC A02. File Number DE87010347.

Accumulated results of Bonneville's regionwide Residential Weatherization Program radon monitoring received as of August 1, 1986, are presented. This data represents only those readings within the service areas of utilities (and the State of Washington, Department of Community Development) who participate in the Residential Weatherization Program. Several areas in the Northwest are excluded in this evaluation. In addition, the amount of results received is heavily weighted by the high number of homes weatherized and monitored by large utilities located in western Oregon and Washington. Due to these limitations, we do not recommend that any conclusions be made on a statewide or regionwide basis. We have provided this regional and state wide data for illustrative purposes only. Specific data by range and township includes only those townships with a minimum of five readings. This has been done to protect the privacy of those residences participating in the program.

33675 (GSF—19/86) **Investigation of atmospheric diffusion by immission measurements of xenon-133 from Fessenheim nuclear power station.** Tschiersch, J. (Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Neuherberg (Germany, F.R.). Inst. fuer Strahlenschutz; Heidelberg Univ. (Germany, F.R.). Inst. fuer Umweltphysik). Jul 1986. 144p. (In German). NTIS (US Sales Only), PC A07/MF A01. File Number DE87751918.

The atmospheric xenon radioactivity was measured from mid 1983 to the end of 1984 in the surroundings of Fessenheim nuclear power station on the right bank of the Rhine. The level of activity (annual mean at Hartheim 1.6 pCi/m/sup 3/ against a background of about 0.2 pCi/m/sup 3/) makes it possible to carry out a diffusion study. Using a one-dimensional Gauss model, expected values of immission were calculated, taking into account the average strength of the source. Radiation balance, degree of cover or global radiation/ degree of cover and wind speed, were used as parameters for atmospheric stability. The agreement between the calculated and measured immission based on weekly averages is satisfactory: about 2/3 of all calculated immissions deviate by less than a factor of 3.5 from the measured values. The accuracy of prediction of the model rises for longer averaging periods; for three months averaging, there is a factor of 1.5 deviation. The drop in concentration between the stations at different distances from the source is predicted too steeply by a factor of 1.5 by the model.

33676 (IAEA-R—3452-F) **Feasibility study on the retrospective evaluation of anomalous local tritium fallout by the analysis of tree rings from selected districts in Austria and Hungary. Final report for the period 1 June 1983-31 May 1986.** Rank, D. (International Atomic Energy Agency, Vienna (Austria)). Jan 1987. 34p. NTIS (US Sales Only), PC A03/MF A01. File Number DE87702277.

In May 1974 some of the rain samples collected in the Austrian Alps exhibited unusually high tritium concentrations. The monthly mean values ranged up to 360 Bq/kg (3000 TU) compared

with the 20-30 Bq/kg background measured in normal areas. Tree samples have been collected from the exposed area and rings of 1973, 1974 and 1975 were separated. Cellulose prepared from the wood was combusted and the water samples were analysed for tritium by LSC. The results of measurements show that tritium fallout detected in rainfall was reflected in tree rings: a significant increase of tritium concentration was found in the 1974 rings from the exposed area. 23 references, 6 figures, 8 tables.

33677 (INIS-mf—10902, pp 24) **After the Chernobyl accident.** Mueller, H.; Kahr, G.; Ninaus, W.; Oswald, K.; Rabitsch, H. Dec 1986. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702298.

In Annual report (October 1985 - September 1986).

33678 **(KFK—4147) Mesoscale atmospheric dispersion experiments using tracer and tetroons simultaneously at Kernforschungszentrum Karlsruhe.** Thomas, P.; Vogt, S.; Gaglione, P. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Meteorologie und Klimaforschung; Commission of the European Communities, Ispra (Italy). Joint Research Centre). Feb 1987. 110p. (EUR—10907-EN). NTIS (US Sales Only), PC A06/MF A01. File Number DE87751927.

On April 27, 1983, March 29, 1984 and March 23 and 25, 1985 four experiments were performed near Kernforschungszentrum Karlsruhe. The experiments comprised: Tracking of tetroons by radar up to distances of 111 km. Release of the tracer SF/sub 6/ at a height of 100 m or 140 m, and downwind sampling at more than 50 locations during up to seven successive periods of 30 min duration each up to source distances of 66 km. Meteorological measurements at a 200 m high tower. The measured data are presented. They have been analysed to obtain dispersion parameters $\sigma(y)$ and $\sigma(z)$ as a function of downwind distance and sampling time.$\sigma(y)$ derived from tracer concentrations and from tetroon trajectories can be well compared, if the duration of the sampling time is taken into account. Vertical wind speeds, turbulence intensities and oscillation periods are determined from tetroon trajectories. The turbulence intensities of the vertical wind component derived from the tetroon's movement can be used to derive the stability category.

33679 **(NRL-F—65) Environmental radioactivity: Annual report, 1985.** (National Radiation Lab., Christchurch (New Zealand)). Mar 1986. 15p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87900737.

Strontium-90 deposition in New Zealand, Fiji, and Rarotonga during 1985 was below the limit of detection at most monitoring stations, with a mean annual deposition of <0.1 MBq km^{-2} - the lowest recorded level since monitoring commenced in 1960. The total beta activity in air continued to be less than the limit of detection at all stations. Strontium-90 and cesium-137 levels in dairy milk were similar to 1984 levels with annual means of 0.03 Bq gCa^{-1} and 0.27 Bq gK^{1}, respectively. High-volume air samplers were installed at Kaitaia and Hokitika during 1985 and future air and rainwater monitoring will be conducted at those sites and Rarotonga only.

33680 **(ORNL—6315) Worldwide fallout of plutonium from nuclear weapons tests.** Holleman, J.W.; Quiggins, P.A.; Chilton, B.D.; Uziel, M.S.; Pfuderer, H.A.; Longmire, J.A. (Oak Ridge National Lab., TN (USA)). Mar 1987. Contract AC05-84OR21400. 295p. NTIS, PC A13/MF A01; GPO Dep. File Number DE87010141.

Measurements of ^{238}Pu and /sup 239,240/Pu fallout from nuclear weapons tests and the SNAP-9A navigational satellite burnup are presented for the years through 1980. Data abstracted from the literature were taken from the stratosphere, atmosphere, and from deposition and surface soil. Over 7300 data entries are included in the 23 tables. The tables are sorted by medium (stratosphere, atmosphere, and deposition near the surface and soil, nuclide, hemisphere, and longitude going from west to east, and are arranged in chronological order. Latitudes are also provided. Fallout levels in SI units (becquerels), calculated from the original readings, and the references from which the original data were taken are given in the report. The appendix is a map showing the various sites from which data were obtained.

33681 **(UCRL—50027-86) Environmental monitoring at the Lawrence Livermore National Laboratory: 1986 annual report.** Holland, R.C.; Buddemeier, R.W.; Brekke, D.D. (Lawrence Livermore National Lab., CA (USA)). Apr 1987. Contract W-7405-ENG-48. 120p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE87010001.

This report documents the results of the environmental monitoring program at the Lawrence Livermore National Laboratory (LLNL) for 1986. To evaluate the effect of LLNL operations on the local environment, measurements of direct radiation and a variety of radionuclides and chemical pollutants in ambient air, soil, surface water, groundwater, vegetation, milk, foodstuff, and sewage effluents were made at both the Livermore site and nearby Site 300. This report was prepared to meet the requirements of DOE Order 5484.1. Evaluations are made of LLNL's compliance with all applicable guides, standards, and limits for radiological and nonradiological releases to the environment. The data indicate that no releases in excess of the applicable standards were made during 1986, and that LLNL operations had no adverse environmental impact.

33682 **Radioactive fallout.** Shapiro, C.S.; Harvey, T.F.; Peterson, K.R. (San Francisco State Univ., San Francisco, CA). pp 167-206 of The medical implications of nuclear war. Solomon, F.; Marston, R.Q. Washington, DC; National Academy Press (1986).

Potential radiation doses from several scenarios involving nuclear attack on an unsheltered United States population are calculated for local, intermediate time scale and long-term fallout. Dose estimates are made for both a normal atmosphere and an atmosphere perturbed by smoke produced by massive fires. A separate section discusses the additional doses from nuclear fuel facilities, were they to be targeted in an attack. Finally, in an appendix the direct effects of fallout on humans are considered. These include effects of sheltering and biological repair of damage from chronic doses.

33683 **Atmospheric perturbations of large-scale nuclear war.** Malone, R.C. (Los Alamos National Lab., Los Alamos, NM). pp 141-154 of The medical implications of nuclear war. Solomon, F.; Marston, R.Q. Washington, DC; National Academy Press (1986).

Several of the papers in this volume have discussed nuclear winter, large fires, and the dynamics of smoke plumes from large fires. I would like to elaborate on this theme by describing new computer simulations of the atmospheric consequences of the injection of a large quantity of smoke. I will focus on what might happen to the smoke after it enters the atmosphere and what changes of perturbations could be induced in the atmospheric structure and circulation by the presence of a large quantity of smoke.

5006 Regulations

REFER ALSO TO CITATION(S) 33131

33684 **(DOE/OR/21400—T307) Economic considerations of atmospheric deposition.** Shriner, D.S. (Oak Ridge National Lab., TN (USA)). [1987]. Contract AC05-84OR21400. 6p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010714.

Major considerations of the acidic deposition issue which will impact an economic analysis can be divided into two categories: welfare analysis and impact analysis. Welfare analysis involves estimation of receptor-specific benefits of a change in levels of atmospheric deposition. Impact analysis involves the translation of receptor-specific benefits to estimates of regional changes in income, employment, and population due to various emissions control policies and, ultimately, to changes in consumer surplus and gross national product. Of the two, welfare analysis is the most problematic. There are basically two reasons for this. First, all of the benefits estimates for individual receptor systems (i.e., forests, crops, materials, etc.) do not take into account price adjustments in other sectors of the economy which may occur as an indirect result of emissions reduction policies. Secondly, the welfare measures used in the individual receptor systems are not always theoretically consistent with

one another (even though they are all calculated in constant-dollar terms).

51 ENVIRONMENTAL SCIENCES, TERRESTRIAL

5101 Basic Studies

REFER ALSO TO CITATION(S) 33731, 33740, 33991, 33996

33685 (CONF-8510249—Vol.2, pp 533-544) **Optimum classification of Landsat thematic mapper data for ecological study.** Ueno, S.; Kawata, Y.; Kusaka, T. (Kanazawa Institute of Technology, Ishikawa, Japan). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

The Landsat-5 Thematic mapper (TM) data have been used to get an optimum information for the ecological study over Kanazawa area in Takayama district in Japan. The subscene of TM data in the study (or test) site covering around 800 x 800 pixels area was extracted from the above full scene data acquired in August 1984. Whereas the original TM data have been radiometrically and geometrically corrected by Geographic Survey Institute, they also performed the preprocessing such as the radiometric and geometric corrections in order to get an optimum information. The statistical summary of such quantities as the spectral radiance in counts, means, variances, and others was presented in the tabulated forms and then the relative apparent reflectance for the whole TM bands was presented. The spectral classification of Landsat-5 TM data for various kinds of land cover types in Kanazawa study area has shown satisfactory results in accuracy. 13 references, 2 figures, 15 tables.

33686 (CONF-8510249—Vol.2, pp 545-552) **Temperature and reflectance monitoring from satellites as an indication of shift and impact of vegetation change.** Bartholic, J.; Kittleson, K. (Michigan State Univ., East Lansing). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

Changes in surface temperature and reflectance, as well as heat and vapor fluxes resulting from the activities of man, are evaluated using energy balance mass transfer equations and meteorological satellite (NOAA, GOES and HCMM) data. Studies were located in Michigan and Florida. Thermal data showed that daytime surface temperatures over large areas could be increased by 10-15°C by modifications resulting from conversion to agriculture. Changes in reflected solar radiation as a function of land use were detectable using satellite data. These changes impacted net radiation and evapotranspiration significantly. 6 references, 5 figures.

33687 (CONF-8510249—Vol.2, pp 565-572) **Dimension reduction and interpretation of multispectral imagery using Chebyshev polynominals.** Pendock, N. (Image Processing Consultants, Sandton, South Africa). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

Principal components analysis is the optimal transformation for reducing the spectral dimension of remotely sensed data by minimizing the mean-square (average) error between the original and transformed spectral bands. This technique is, however, computationally expensive for data with high spectral dimension, and minimizing the maximum error of representation, rather than the average error, may be a better strategy for the detection of certain spectral features. Such a computationally efficient uniform transformation may be achieved by fitting a polynomial to each spectral vector and then reducing its degree through the use of Chebyshev polynomials. These two dimension reduction techniques are applied to Daedalus ATM 11 band spectral data and are compared. 4 references, 2 tables.

33688 (CONF-8510249—Vol.2, pp 581-594) **Registration of spaceborne SAR data to large scale topographic maps.** Meier, E.H.; Nueesch, D.R. (Univ. of Zuerich, Switzerland). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

This paper reviews the fundamentals of spaceborne SAR data registration to topographic maps and shows a potential procedure applied to SEASAT image data in a mountainous region. With the aid of control points they determine the Doppler frequencies and the pulse transit times which has been used for the image correlation. After deriving the squint angle and the slant ranges, taking into account the position and the motion of the platform as well as a digital terrain model they apply a geometric correction through an indirect transformation. They are able to achieve an average misregistration in azimuth and range of 30 m in an area of 74 x 76 km where elevations of 300 m and 2500 m above sea level occurred. 9 references, 12 figures.

33689 (CONF-8510249—Vol.2, pp 595-606) **Commercial forest plantation survey by Landsat (MSS) digital image processing.** Guillon, L.; Mestres, J. (CNIE, Argentina). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

Commercial forest plantations in Argentina are chiefly composed by Pinus sp and Eucaliptus sp in the northern area of the country (warm temperate to sub-tropical). The plantations cover medium to small surfaces and are scattered in large areas. Thus, in order to produce satellite images for forest surveys, a search was carried out to find the most suitable combination of natural bands and/or sinthetical channels for that purpose. These species were surveyed in two different areas: (a) a warm temperate and humid one where vegetation consist of crops, pastures and natural grasses; (b) a humid subtropical area, where natural vegetation is chiefly woody. Several digital treatments were carried out, combining natural bands with sinthetical channels in different color combinations, with one date images as well as with two dates images. A highly satisfactory result was achieved by the combination of B5, B7 and B6/B4 ratio, with histogram equalization enhance, and then a lineal enhance, released at 1:250,000 scale. 4 references, 5 figures.

33690 (CONF-8510249—Vol.2, pp 607-616) **Selected comparison of aircraft-borne and orbital imaging radar data - and the geologic significance of this.** Feder, A.M. (Western Geophysical Co. of America, Houston, TX). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

A brief history of radar geology phases into a discussion of the technology's significance. Orbital and aircraft-borne imaging radar systems are then introduced. This is followed by discussion of characteristic parameters of both type systems. Included in this are wavelength/terrain penetration, resolution, precision, illumination, coverage, and even economic factors, the latter in a qualitative manner. The selected geologic contents of two image sets are then compared. Each set consists of an orbital, and an aircraft-system acquired radar image: one set being for an arid region, the other for a humid trophic region. A salient fact arising from the comparison is that each subject system can produce a unique image content. This is emphasized to be primarily a function of the radar equipment characteristic of each of the two involved vehicle types, rather than the data acquisition modes. Both the longer wavelength orbital, and shorter wavelength aircraft-borne radar types have their distinct utility, it is concluded, so that the use of both their data in a complementary manner promises best results for geologists. 15 references, 14 figures, 1 table.

33691 (CONF-8510249—Vol.2, pp 633-642) **Mapping land cover types in England and Wales using Landsat Thematic Mapper imagery.** Deane, G.C.; Churchill, P.N.; Griffiths, G.H. (Hunting Technical Services Ltd., Herts, England). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

Landsat Thematic Mapper imagery for the whole of England and Wales is being interpreted, using computer-aided analysis techniques, to provide statistical information on the distribution of major land cover types. Existing aerial photographs for a number of randomly located sites, together with current ground data, are being used to provide training information for use in supervised spectral classifications of these TM data. Aerial photography and ground data for other areas are being used to establish the accuracy of the TM classifications. In order to achieve the required results, the TM data are corrected to the UK National Grid so that area estimates of the extent of land cover types for each major administrative region can be calculated. The land cover types identified include cultivated land, grassland, woodland, the extent of urban areas and certain semi-natural vegetation types. This study, which is also intended to define a method of monitoring future changes in the extent of these land cover features, is part of a project currently being carried out on behalf of the British Government. 5 references, 5 tables.

33692 (CONF-8510249—Vol.2, pp 643-654) **Accuracy of subresolution measurements using two-wavelength IR-thermography.** Axelsson, S.R.J. (Univ. of Linkoeping, Sweden). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

A main limitation at the application of AVHRR-data is the moderate ground resolution, which gives a suppression of contrasts covering only a minor part of the resolution cell. As shown earlier, however, the temperature and area of hot spots like gas flares can be estimated by combining thermal-IR data from 3.8 and 11 μm. In this paper, the two-wavelength method is studied in more detail. First, the dual channel information from mixed pixels, containing an arbitrary number of black-body radiators of different temperatures, is analyzed. The accuracy of the inversion procedure is then further investigated, taking into account the effects of sensor noise, emissivity, atmospheric transmission, and reflected solar radiation. The results indicate that the subpixel temperature variations should be at least 20-30 K in order to be well separable from homogeneous pixels. In the day-time, areas with high reflectance of solar radiation will give a similar response as hot spots. This effect enhances the two-wave-length temperature difference over urban areas, which have bare surfaces with both increased temperature and reflectivity. 4 references, 8 figures.

33693 (CONF-8510249—Vol.2, pp 655-670) **Data structure with applications to remote detection of environmental change.** Sanchez, P.P.; Taheri, S.A. (Environmental Research Institute of Michigan, Ann Arbor). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

This paper describes a data structure intended to support an unsupervised clustering approach to spatial preprocessing of imagery. The data structure described here both at rest and in action, utilizes the operating system concept of a bit map to group together in clusters called blobs, spatially and spectrally similar pixel vectors. This clustering technique is useful as a preprocessing step for categorizing terrain features as units larger than the individual pixels, and also for characterizing spectral/spatial/temporal features for change detection. The data structure described here utilizes a variety of auxiliary index arrays to minimize search time during the dynamic creation, updating and closing of blobs. The data structure is isomorphic to one supporting the dynamic allocation of memory within an operating system. 3 references.

33694 (CONF-8510249—Vol.2, pp 671-678) **Simulation software of synthetic-aperture radar.** Kohno, I.; Takano, O.; Ono, M.; Tanaka, H. (Earth Resources Data Analysis Center, Tokyo, Japan). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

Research and development for data use of the synthetic aperture radar (SAR) images is in progress in Japan. However it is not so good enough to get suitable SAR images for this purpose. In due consideration of such present status, a SAR simulation software has been developed. This simulation software, consists of eight major blocks, possesses high simulation capability for various kinds of simulation parameters. To ascertain the simulation whether it is good or not, some kinds of simulated SAR images have been compared with the real SAR images. As the result, it is confirmed that the simulated SAR images show good coincidence with the real SAR images. This paper gives an outline of the SAR simulation software. 8 figures, 1 table.

33695 (CONF-8510249—Vol.2, pp 679-688) **Calibration of airborne imaging spectrometer data to percent reflectance using field spectral measurements.** Roberts, D.A.; Yamaguchi, Y.; Lyon, R.J.P. (Stanford Univ., CA). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

Data collected by the Airborne Imaging Spectrometer (AIS), a 128 channel scanner that measures radiance from the 0.9 to 2.4 μm region, were calibrated to percent reflectance using homogeneous, unvegetated ground targets. The resulting calibrated data were compared to data processed using three laboratory-based techniques designed to normalize solar irradiance and remove atmospheric absorption irradiance and remove atmospheric absorption features. The three techniques are the Flat Field correction, the Least Upper Bound Residual and the Log Residual. The Flat Field correction normalizes the data by dividing every pixel in the image by a non-absorbing, flat spectrum. The Least Upper Bound Residual and Log Residual normalize the data using a modeled relationship between topography, wavelength and radiance to calculate reflectance. The Least Upper Bound Residual uses a maximum spectrum in its calculations. The Log Residual utilizes the same modeled relationship replacing the maximum spectrum with an average spectrum. The results demonstrated that calibration using field spectra was a superior technique in terms of lower noise, lack of artifacts and interpretability. 3 references, 13 figures, 2 tables.

33696 (CONF-8510249—Vol.2, pp 697-710) **Statistical analysis of forest harvest depletion mapping accuracy using LANDSAT MSS data.** Archibald, P.D.; Ahern, F.J. (Pamap Graphics, RPF, Victoria, British Columbia). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

Two large sample statistical studies were conducted to determine the mapping accuracy for forest harvest boundary delineation by visual interpretation of LANDSAT Multispectral Scanner (LMSS) data. The imagery used in the trial was a two date overlay formed by an earlier date band 5 image assigned to the color blue overlaid by a later date band 5 image assigned to the colors red and green. The trial images for both study areas were resampled to 25 m pixel spacing using sinx/x interpolation. Three categories of mapping accuracy criteria are discussed and reported: areal errors, measures that describe linear errors in boundary placement, and circularity shape index comparisons for indicating boundary resolution losses. Overall areal extent was overestimated by 3 and 11% for the William's Lake and Cranbrook study areas respectively. The greatest sample variance occurred for smaller depletions. Boundary placement was found to have a root-mean-square accuracy of 40 to 45 m and narrow complex shaped features were not often apparent in LMSS data. 13 references, 6 figures, 5 tables.

33697 (CONF-8510249—Vol.2, pp 727-728) **Morphology and evolution of Dukhan sabkha, western Qatar, based on Landsat imagery interpretation.** El Kassas, I.A.; Ashour, M.M.; Nasr, B.A. (Univ. of Qatar, Doha). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

In this present work, Landsat imagery data has been interpreted to delineate the surface features of this sabkha, and to elucidate its origin and geomorphic evolution. The satellite data used includes black-and-white images of the MSS bands 4, 5, and 7, color-sliced images of band 5, and false-color composites of the three bands. This interpretation has been corroborated by intensive field work and compilation of all available published works. The study

led to an accurate delineation of the present boundaries of this inland sabkha and its classification, for the first time, into three main tonal units of characteristic spectral signatures on Landsat-MSS images. These units are named according to their abundant constituents as follows: (1) sandy-silty loam, (2) gypsiferous clays, and (3) salt crust. In addition, wherever sand-shadows are found, halophylic plants are growing and they display darker tones on the Landsat images. Significant shoreline changes of the Arabian Gulf occurred during recent times, which have had a significant impact on the western coast of Qatar Peninsula. The major factors affecting movement of the shoreline include climatic changes, changes in relative sea-level position, sediment budget, coastal processes, topography and regional tectonics. The origin of Dukhan sabkha is discussed and the shoreline movement in western Qatar is elucidated in the light of three factors and the elaborate interpretation of Landsat MSS data.

33698 (CONF-8510249—Vol.2, pp 729-738) **Using Landsat TM imagery and spatial modeling in automatic habitat evaluation and release site selection for the ruffed grouse (Galliformes: tetraonidae).** Palmeirim, J.M. (Univ. of Kansas, Lawrence). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

Thematic Mapper (TM) imagery was integrated in a Geographic Information System (GIS) to develop automated models to evaluate and map ruffed grouse habitat, and select potential release sites for that species in northeastern Kansas (USA). Forest cover was mapped from a TM image using a mixed spectral/contextual approach. The high resolution of the TM imagery allowed a detailed mapping of forest edge, a critical element of potential grouse habitat in this region. Forest areas were then evaluated as potential ruffed grouse habitat by a spatial model using the following elements: (1) woodlot size, (2) woodlot interconnection, (3) amount of forest edge, (4) distance to woodlot edge, and (5) forest type. Another model generated a map of release site suitability based on the regional amount and quality of appropriate habitat. The results obtained were evaluated by wildlife management professionals familiar with the grouse and the local habitat conditions. It was concluded that the techniques employed have substantial potential as tools in grouse management. 19 references, 9 figures.

33699 (CONF-8510249—Vol.2, pp 739-748) **Present and future uses of AVHRR multispectral data.** Koczor, R.J.; Comeyne, G.J. Jr. (ITT Aerospace/Optical Div., Fort Wayne, IN). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

The present series of NOAA low Earth orbiting satellites became operational in October 1978. Since then, four additional satellites have been launched in this series and three more are in fabrication. Planning is underway for at least three more. The Advanced Very High Resolution Radiometer (AVHRR) is a prime imaging sensor on board these satellites. It is a multi-spectral imaging radiometer which has evolved in both function and the use of its data products. Investigators in a wide variety of disciplines are finding the readily available, high quality, moderate resolution data useful in their studies. The AVHRR is again undergoing changes which will enhance its data. A new spectral channel at 1.6 μm and modification of present channels are planned for the next group of satellites in this series. 20 references, 8 figures, 3 tables.

33700 (CONF-8510249—Vol.2, pp 765-772) **Forest inventory in Thailand using remote sensing techniques.** Charuppat, T.; Adisornprasert, P. (Royal Forest Dept., Bangkok, Thailand). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

The Royal Forest Department has been utilizing Landsat imagery in their survey and mapping efforts since the launch of Landsat-1 in 1972. At present Landsat imageries have shown that Thailand's total forest resources diminished about 12.69% or 65.107 Km^2 between 1973 (43.21% of the land area) and 1982 (30.52% of land area). In view of a national policy of conserving 40% of the country in forest cover, there is a continuing and urgent need to monitor forest extent and condition on a routine basis. It would appear that satellite observations will continue to be an integral part of this monitoring effort. 5 references, 4 tables.

33701 (CONF-8510249—Vol.2, pp 773-780) **Variability of classification with maximum likelihood based discriminant functions.** Prugent, C.; Fernandez, S.; Gargantini, C.; Poljanec, A. (CNIE, Argentina). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

In this paper the authors tried to show the variability in the classification of Landsat images by means of the very well known maximum likelihood discriminant function as well as the bayesian classifiers. Several images obtained using the bootstrap statistical method show graphically such variability. Some suggestions for multitemporal analysis are made, specially for the Bahwar's model which use the Kauth-Thomas transform of Landsat multitemporal data. In fact the K-T transform implies a concept very close to the principal components and then have the same problems on the variability which implies some doubts in the reliability of the results. 13 references, 4 figures.

33702 (CONF-8510249—Vol.2, pp 781-790) **Use of remote sensing for wetlands assessment in hazardous waste sites.** Norton, D.J.; Prince, J. (Bionetics Corp., Warrenton, VA). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

The US Environmental Protection Agency (EPA) Office of Emergency and Remedial Response has established policy requiring the identification and assessment of wetlands within or near CERCLA (Superfund) hazardous waste sites, as a component of remedial action planning. The utility of historical and current aerial photography as a data source for wetlands assessment has been investigated in studies conducted for EPA Region 1 by the EPA's Environmental Photographic Interpretation Center (EPA/EPIC). Specific applications of aerial photo analysis for wetlands assessment are discussed in this paper and demonstrated in a pilot study in the New Bedford, Massachusetts area. The two primary components of wetlands assessment were viewed as identification and evaluation. The identification phase, involving such elements as wetland boundary delineation, vegetation cover typing, and measurement of physical parameters, could generally be accomplished through conventional analysis of aerial photography. Evaluation appeared to be potentially more complex and less consistently adaptable to the use of remote sensing alone. Image availability and quality, interpreter skill, and ground truth information are other significant variables, which collectively can determine whether an aerial photographic wetlands assessment will be valuable to the particular case at hand. 12 references, 2 figures, 1 table.

33703 (CONF-8510249—Vol.2, pp 799-808) **Wetland physical and biotic studies using multispectral data.** Ormsby, J.P.; Gervin, J.C.; Nickeson, J.E.; Willey, G. 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

A mid-fall (November 2, 1982, WRS 40109-15140) Landsat-4 Thematic Mapper (TM) scene and multi-temporal L-band radar data were used to study the physical boundaries, structure and composition of biotic communities within the Blackwater National Wildlife Refuge. The study area is close to the Chesapeake Bay, whose tidal fluctuations interact with the fresh water rivers and creeks to create a complex, brackish wetland. The wetland communities, as a result, are influenced by both salt and fresh water producing an ever changing environment. These constant changes leave the area open to erosion and siltation. The TM data were used to delineate forest, open water, agriculture and various wetland communities. The overall Level I agreement between the TM classification and a ground and air photo interpretation was 81%. The microwave data provided information on water extent, relative plant height, and flooded areas beneath vegetation. The combination of both data types provides valuable information for monitor-

ing changing conditions within these importance, but inaccessible, natural areas. 9 references, 2 figures, 2 tables.

33704 (CONF-8510249—Vol.2, pp 809-820) **Monitoring desertification through detection of land cover changes by albedo mapping with AVHRR data.** Roller, N.E.G.; Colwell, J.E.; Aggarwala, R. (Institute of Michigan, Ann Arbor). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

The purpose of this study was to demonstrate one possible and relatively simple approach for regional albedo mapping using AVHRR data. The procedure is demonstrated in a region of the globe (the Sahel of Africa) where possible albedo changes associated with desertification could have significant long-term effects on climate. Although the procedure as implemented should be improved and verified before definitive conclusions can be made, initial indications are that the assumptions of some climate modelers regarding the effect of desertification on albedo (and hence on long-term climate) may not apply in the Sahel of Africa. 14 references, 9 figures, 2 tables.

33705 (CONF-8510249—Vol.2, pp 821-828) **Removal of atmospheric and topographic effects from Landsat MSS image.** Kawata, Y.; Ueno, S.; Kusaka, T. (Kanazawa Institute of Technology, Ishikawa, Japan). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

It has been known that surface reflectance data measured by the Landsat include unwanted noises such as atmospheric and topographic effects. The correction of these effects is very important to increase the accuracy in the classification. In this paper they propose a simple radiometric correction method which removes both atmospheric and topographic effects from the remotely sensed data. They apply it to a mountainous test site whose digital terrain data are available. The results show that the rejection of both effects is, to some extent, successfully done on the Landsat's band 7 image over rugged terrain. The values of necessary atmospheric parameters in the evaluation of reflection and transmission functions, such as the optical thickness, the single scattering albedo and the turbidity factor of the atmosphere, are computed from LOWTRAN 5 code. The Lambert's law of reflection is assumed in this study. 11 references, 7 figures.

33706 (CONF-8510249—Vol.2, pp 847-848) **High spectral resolution imaging for forestry.** Olson, C.E. Jr. (Univ. of Michigan, Ann Arbor). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

Collins' airborne spectroradiometer provided indications that high spectral resolution data are of great value in many types of vegetative surveys. Subsequently, the Jet Propulsion Laboratory designed, built, and flew an Airborne Imaging Spectrometer (AIS). Data were collected with both the Collins' instrument and the AIS on August 7 and 9, 1983, respectively, over the Sleeping Bear Sand Dunes Test Site in northwestern lower Michigan. Flight lines crossed both coniferous and broad-leaved forest stands on both upland and wet sites. Analyses of the data from the two sensors revealed detectable differences between the water-stressed plots and their backgrounds. Differences were also detectable between different tree species. While some of these differences might be detectable in broad-band sensors, spectral placement of these bands is important to success. The optimum placement for species discrimination in wetlands appears to be approximately 20 nm shorter than for uplands. A single band including the total region desired for both wetlands and uplands would include reflectance cross-overs which mask species differences. Digital classification of forest species was attempted with supervised and unsupervised procedures. Results of a step-wise regression analysis identified narrow bands in the 450 to 520 nm spectral range as more effective in discriminating between tree species than any bands between 550 and 1050 nm, or between 1400 and 2400 nm. High spectral resolution, while not essential for all forestry purposes, is providing information which will help us identify the best spectral band placement for remote sensing in forestry.

33707 (CONF-8510249—Vol.2, pp 849-854) **Metalanguage for spectral geobotany.** Fortescue, J.A.C.; Singhroy, V.H. (Ontario Geological Survey, Toronto). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

The aim of this paper is to provide fundamentals for the discipline which may be used universally for the description of studies in spectral geobotany. This is done by means of two descriptive equations. The first, the Main Equation describes the unique contribution which spectral geobotany makes to environmental science as a whole and the second is put forward as a basic statement in a meta-language which may be used by practitioners of geobotany as a guide to planning and solving particular problems within the subject. The Meta-language Equation for Spectral Geobotany provides a convenient starting point for the adoption of a holistic approach to spectral geobotany. The metalanguage equation is designed to facilitate the eventual production of an Expert System for spectral geobotany. 2 references.

33708 (CONF-8510249—Vol.2, pp 855-864) **Digital GIS based on Landsat and other data for elk habitat effectiveness analysis.** Eby, J.R.; Bright, L.R. (Univ. of Washington, Seattle). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

An elk habitat effectiveness index model is under development by natural resource agencies in Oregon to address resource management concerns. This model was adapted and applied through a digital GIS approach. Landsat and other data sources were used to construct the data planes of cover and forage quality, distance from habitat edge, and road density needed as variables in the model. The data planes were created, manipulated and combined using the VICAR/IBIS image processing software system. The result was an overall effectiveness index number for elk habitat as well as a pixel by pixel evaluation that could be used in resource planning and allocation processes. 11 references, 6 figures, 2 tables.

33709 (CONF-8510249—Vol.2, pp 897-908) **Video disc prototype for emergency operations.** Lichy, D.E. (Army Corps of Engineers, Ft. Belvoir, VA). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

The US Army Corps of Engineering is evaluating the state-of-the-art in data transmission technology to facilitate and improve information transfer within the Corps of Engineers. At the present time, one area being investigated is the use of video disc technology to reduce the amount of data which must be transmitted in order to provide an effective teleconferencing. The video disc map data base consists of 108,000 frames of all the maps contained in SWD and LMVD for the 1:2,000,000 and 1:250,000 USGS map sheets and Corps of Engineers project maps. Incorporated in the disc is FEMA's map requirements related to the New Orleans, Galveston-Houston, Tulsa, and Dallas-Fort Worth areas. NOAA's portion of the disc includes aeronautical and nautical charts and various examples of LANDSAT and METSAT satellite imagery. The video disc map image is used as a background map for graphics overlay information to be transmitted between video disc workstations. The prototype system consists of 8 networked video disc workstations for teleconferencing capabilities located at FEMARegion 6, LMVD, SWD, OCE Headquarters, WRSC, NOAA-NOS and NESDIS, and UGSS. 3 figures, 3 tables.

33710 (CONF-8510249—Vol.2, pp 1087-1102) **Indian program in earth observation systems.** Moorthi, D.N. (Indian Space Research Organization, Washington, DC). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

The Indian Space Program from its evolution in the sixties has been giving major thrust to the realization of operational capabilities using space platforms for monitoring earth resources and environment. The resulting comprehensive end-to-end program in remote sensing spans major aspects such as aircraft systems for

aerial surveys; space segments and sensors; data acquisition and interpretation facilities and application activities in close coordination with a number of user agencies.

33711 **(DOE/ER/60424—1) An experimental analysis of granivory in a desert ecosystem: Progress report.** Brown, J.H. (Arizona Univ., Tucson (USA). Dept. of Ecology and Evolutionary Biology). Mar 1987. Contract FG02-86ER60424. 8p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010432.

Controlled, replicated experiments are revealing the network of interactions that determine structure, dynamics, and energy transfer in a desert community that is functionally interconnected by the consumption of seeds (granivory). This community includes seed-eating rodents, ants, and birds, seed-producing annual and perennial plants, and other kinds of organisms that interact with these. The experiments entail removal of important species or functional groups of granivores or plants and supplementation of seed resources. The results demonstrate a large number of direct and indirect interactions that have important effects on the abundance of species and functional groups, the structure of the community, and the dynamics of energy flow. The results suggest that networks of interaction are structured with sufficient overlap in resource requirements and interconnections through indirect pathways that community- and ecosystem-level processes, such as energy flow, are relatively insensitive to major perturbations in the abundance of particular species or functional groups. This preliminary finding has important implications for understanding the response of ecosystems to natural and human-caused perturbations, for the management of agricultural and other human-modified ecosystems, and for the design of perturbation-resistant networks for acquisition and distribution of human resources such energy and information. 44 refs.

33712 **Insect herbivory and photosynthetic pathways in old-field ecosystems.** Pinder, J.E. III; Kroh, G.C. (Univ. of Georgia's Institute of Ecology, Aiken, SC). *Ecology;* **68**: No. 2, 254-259(Apr 1987). Contract AC09-76SR00819.

Three old-field communities of varying composition near Aiken, South Carolina, were used to test the hypothesis that phytophagous insects avoid consuming plants possessing the C_4 photosynthetic pathway and consume plants that possess only the C_3 pathway. The relative abundances of stable carbon isotopes in insect tissues, which indicate consumption of C_3 or C_4 plants, were used to determine if insects were consuming C_3 and C_4 plants in proportion to their abundance in the plant community. In one community, the carbon isotope ratio for insects was significantly less than that expected for proportional consumption and indicated avoidance of C_4 species. Insect consumption of C_4 plants was $\approx$ 50% of that expected if insects were consuming C_3 and C_4 plants in proportion to their abundance. In the other two communities, the differences between observed and expected isotopic ratios were not significant. Levels of insect consumption of C_4 plants in these two communities were, respectively, $\approx$ 82% and $\approx$ 126% of those expected for proportional consumption. The results suggest that the degree of avoidance varies among plant communities.

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REFER ALSO TO CITATION(S) 33660, 33662, 33681, 33725, 33726

33713 (CONF-8510249—Vol.2, pp 757-764) **Assessment of multitemporal Landsat MSS data for geobotanical remote sensing in the Spanish Pyrite Belt.** Banninger, C. (Institute for Image Processing and Computer Graphics, Graz, Austria). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

Early spring acquired Landsat MSS data from a coniferous tree stand growing in soils containing high concentrations of copper, lead, and zinc best define the geochemical anomaly of five spring to summer Landsat scene dates examined. For nineteen single and transformed Landsat MSS bands and five scene dates analyzed, the perpendicular vegetation (PVI7) and difference vegetation (DVI) indices are the most successful in distinguishing heavy metal stress in forest canopies, followed, in decreasing order of usefulness, by band 7, the band difference index (BD7), the first principal component (PC1), and the Kauth-Thomas green vegetative index (GVI). When only the early spring scene dates are considered, the band difference index (BD6), perpendicular vegetation indices (PVI6 and PVI7), Kauth-Thomas green vegetative index (GVI), difference vegetation index (DVI), and the band difference (BD7) are essentially equally useful in defining geobotanical anomalies. 8 references.

33714 **(CONF-8704129—1) Acid rain: Implications for the Lake States forests.** Shriner, D.S. (Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 17p. NTIS, PC A02/MF 01; GPO Dep. File Number DE87009821.

From Upper great lakes governors' conference on forestry; Minneapolis, MN, USA (9 Apr 1987).

The purpose of this paper is to provide a general overview of the "acid rain" issue, to summarize a new research initiative investigating the role of sulfur deposition on the condition of Lake States hardwood forests, and finally, to discuss the potential implications of acidic rain on Lake States forests, given current levels of uncertainty.

33715 **(PB—87-178315/XAB) Protocol for evaluating interim status closure/post-closure plans. Final report.** Bagus, L.J. (Kearney (A.T.), Inc., Chicago, IL (USA)). Aug 1986. 90p. NTIS, PC A05/MF A01.

See also PB—87-178307; Errata sheet inserted.

The protocol provides a format for evaluating the quality of interim status closure and post-closure plans approved by States or EPA Regions for implementation by owners/operators. It is intended for use by technical or non-technical personnel and is designed to assist in detecting omissions and inadequate plan provisions. Effective use of the protocol requires a working knowledge of the RCRA regulations and Agency policy and guidance, along with some familiarity of RCRA closure and post-closure plans. The protocol does not consider the direct evaluation of technical adequacy, but rather identifies the technical items that must be addressed by the closure plan. It also identifies those supporting documents, analyses, etc., that must be in the administrative record. This is intended to help the reviewer ascertain whether the plan was properly derived and whether the process followed was properly documented in the record.

5103 Radioactive Materials Monitoring And Transport

REFER ALSO TO CITATION(S) 32507, 32587, 32588, 32908, 32949, 33666, 33667, 33668, 33670, 33673, 33677, 33679, 33681, 33725, 33726, 33727, 33752, 34223

33716 (CONF-860932—, pp 43-46) **Aerial survey efforts in the search for radon-contaminated houses in the Reading Prong area near Boyertown, Pennsylvania.** Hoover, R.A.; Mateik, D.E. (EG & G Energy Measurements, Inc., Suitland, MD). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

At the request of the Commonwealth of Pennsylvania, the Department of Energy requested EG & G Energy measurements to fly an aerial radiological survey over a portion of the Reading Prong near Boyertown, Pennsylvania. The survey goal was to help locate regions where buildings contained elevated levels of radon gas. A 250 km2 area was surveyed. A number of sites were located. These sites correlated fairly well with known geologic faults in the area.

33717 (CONF-860932—, pp 103-107) **Mobile laboratory - emergency sample analyses at the accident site.** Wilson, R.H. (Pacific Northwest Lab., Richland, WA). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

The Pacific Northwest Laboratory (PNL) provides technical support to the Department of Energy (DOE) with rapid response

to the site of a radiological accident for initial assessment of radiological conditions in the surrounding environs. A mobile laboratory manned with a trained crew is capable of collecting, preparing, and analyzing air, liquid, vegetation, and soil samples from the areas surrounding the accident site. Rapid assessment of radiological conditions is important to enable responsible agencies to immediately administer appropriate response and coordinate any necessary longer-term management of the accident site. Sensitive instrumentation and support equipment provide the capability to rapidly assess environmental conditions for uncontrolled areas as stated in DOE Order 5480.1 Chapter XI. A regimen is required to maintain proficiency and to train new crew members. A professional team responding with a well-equipped mobile laboratory capable of providing quick analytical results has a positive impact on public relations. Confidence is also generated among other agencies with an awareness of the technical expertise that is available for assistance and backup in the event of a radiological accident.

33718 **(CONF-870601—16) Removal of transuranics from Johnston Island soil by fractional classification.** Sunderland, N.R. (AWC, Inc., Las Vegas, NV (USA)). 7 Jun 1987. Contract AC08-86NV10471. 7p. NTIS, PC A02/MF A01; GPO Dep. File Number DE87010425.

From Annual meeting of the American Nuclear Society; Dallas, TX, USA (7 Jun 1987).

The following conclusions were reached as a result of the research conducted with the TRUclean process on Johnston Island: Processed materials will have a total TRU activity of less than 500 Bq/Kg. Approximately 90% of the TRU activity in coral/soil is removed by a single pass through the fractional classification process. A volume reduction of greater than 90% of the original contaminated volume can be achieved with the returned "clean" volume less than or equal to the cleanup criteria. Reprocessing or multiple staging of the process units will yield overall efficiencies of greater than 90%. Continued testing at Nevada Test Site confirmed these conclusions.

33719 **(DOE/ER/60220—10) Studies in iodine metabolism: Monitoring of animal thyroids: Final progress report, April 1983 through March 1987.** Van Middlesworth, L. (Tennessee Univ., Memphis (USA). Dept. of Physiology and Biophysics). 1987. Contract FG05-84ER60220. 100p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE87010231.

This report contains the results of monitoring radioiodine and radiocesium levels in both domestic and wild animals. Included are thyroids of cattle and sheep before and after the Chernobyl accident, monitoring of thyroids from deer kills on the Oak Ridge Plantation and the Savannah River Reserve. (DT)

33720 **(DOE/EV/10305—18) Radioecological investigations of uranium mill tailings systems: Final report for the period September 1, 1979 through April 30, 1987.** Whicker, F.W.; Ibrahim, S.A. (Colorado State Univ., Fort Collins (USA). Dept. of Radiology and Radiation Biology). 30 Apr 1987. Contract AC02-79EV10305. 27p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87010360.

This document is the final report on studies of the integrity and transport of uranium and radioactive progeny in active and reclaimed uranium mill tailings. The overall program was designed to provide basic information on the radioecology of ^{238}U, ^{230}Th, ^{226}Ra, ^{210}Pb and ^{210}Po, responses of plants and animals to the landscape disruptions associated with uranium production, and guidance for impact analysis, mitigation and regulation of the uranium industry. The studies reported were conducted at the Shirley Basin Uranium Mine, which is operated by the Pathfinder Mines Corporation. The mine/mill operation, located in southeastern Wyoming, is typical in terms of the ore body, mill process, and ecological setting of many uranium production centers in the western United States. The research was motivated originally by the general lack of knowledge on the transport of uranium and its radioactive daughter products through the environment, particularly through food chains in the immediate environs of uranium production operations. The work was also motivated by the relatively high contribution of uranium mining and milling to the radiation exposure of the general population from the nuclear fuel cycle.

33721 **(OEFZS—4383) Seiberdorf scientists give answers to questions in connection with the Chernobyl reactor accident.** Haunold, E. (Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H.). Feb 1987. 54p. (In German). (LA—172/87; AR—26/87; ST—143/87). NTIS (US Sales Only), PC A04/MF A01. File Number DE87702400.

This is a collection of 8 largely non-technical papers written by experts in radiation protection, biology and agriculture from the Austrian Research Centre Seibersdorf, on the consequences for Austria of the Chernobyl fallout and washout. 5 papers are also published (partly under different titles) in the journals Pflanzenarzt 7-8, 1986, Agrozucker 4, 1986 und Blick ins Land, 1986. From the rest, one paper is treated separately for INIS while two papers are elemtary general introductions to radioactivity, radiation, units and doses. (G.Q.).

5105 Site Resource And Use Studies

REFER ALSO TO CITATION(S) 32617, 32697, 33686, 33730

33722 **(BDX—613-3724) Annual site environmental report for calendar year 1986.** Ramirez, J.M. (Allied Corp., Kansas City, MO (USA). Bendix Kansas City Div.). May 1987. Contract AC04-76DP00613. 84p. NTIS, PC A05. File Number DE87010552.

This report has been prepared to fulfill the requirements of DOE Order 5484.1 for environmental monitoring by the Industrial Ecology Department at the Allied Corporation, Bendix Kansas City Division. All environmental monitoring, including analyses and data management, is administered by the Environmental Protection Department. This report summarizes the significant information resulting from the environmental and effluent monitoring programs at the Kansas City Plant in CY1986. No radioactive materials are machined or processed at the plant and therefore, there are no radioactive effluents from the plant.

33723 (CONF-8510249—Vol.2, pp 885-890) **Study of urban climates through thermal images from meteorological satellites.** Lombardo, M.A. (Universidade de Sao Paulo, Brazil). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

Through the use of LANDSAT images it is possible to verify an intensive occupation of the land in the Great Sao Paulo. Only 2.5% of the urban area is covered by vegetation. It was verified that this vegetation assures a more comfortable temperature. A procedure was developed to get temperature maps from thermal images of the satellites NOAA 7 and NOAA 8. This procedure takes into account the effects of the atmosphere calibration curves of the sensors and emissivity of surface materials. Through sample areas, patterns of land use which were important to estimate the emissivity were extracted. By using air photographs in the scale of 1:8,000 eighteen samples of different patterns of land use were analyzed. These samples, with dimensions of 1 km^2 were adjusted to the spatial resolution of the images. For every class of land use, the emissivity of the material present in the sample are measured. The integrated emissivity of the targets are considered to be the average of three measurements. 21 references, 2 figures, 2 tables.

33724 **(DOE/BP/62775—1) Wildlife protection, mitigation, and enhancement plan, Palisades Project: Final report.** Meuleman, G.A.; Martin, R.C.; Hansen, H.J. (Idaho Dept. of Fish and Game, Boise (USA)). Feb 1987. Contract AI79-86BP62775. 118p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE87009911.

Under direction of the Pacific Northwest Electric Power Planning and Conservation Act of 1980 and the subsequent Northwest Power Planning Council's Columbia River Basin Fish and Wildlife Program, projects have been developed in Idaho and Wyoming to mitigate the losses of wildlife habitat and annual production due to the development and operation of the Palisades Project. A modified Habitat Evaluation Procedure (HEP) was used to assess the benefits of the preferred mitigation plan to wildlife. The inter-

agency work group used the target species Habitat Units (HU's) lost with inundation of the reservoir area as a guideline during the mitigation planning process, while considering needs of wildlife in eastern Idaho and western Wyoming. A total of 37,068 HU's were estimated to be lost as a result of the inundation of the Palisades Reservoir area. Through a series of protection/enhancement projects, the preferred mitigation plan will provide benefits of an estimated 37,066 HU's. Target species to be benefited by this mitigation plan include bald eagle, mule deer, elk, mallard, Canada goose, mink, yellow warbler, black-capped chickadee, ruffed grouse, and peregrine falcon.

33725 **(DPST—85-700) L-Area Oil and Chemical Basin: Environmental information document.** Pekkala, R.O.; Price, V.; Bledsoe, H.W. (Savannah River Lab., Aiken, SC (USA)). Dec 1986. Contract AC09-76SR00001. 169p. NTIS, PC A08/MF A01; 1; GPO Dep. File Number DE87010176.

This document provides environmental information on postulated closure options for the L-Area Oil and Chemical Basin at the Savannah River Plant and was developed as background technical documentation for the Department of Energy's proposed Environmental Impact Statement (EIS) on waste management activities for groundwater protection at the plant. The results of groundwater and atmospheric pathway analyses, accident analysis, and other environmental assessments discussed in this document are based upon a conservative analysis of all foreseeable scenarios as defined by the National Environmental Policy Act (40 CFR 1500-1508). The scenarios do not necessarily represent actual environmental conditions. This document is not meant to be used as a regulatory closure plan or other regulatory document to comply with required federal or state environmental regulations.

33726 **(DPST—85-709) Ford Building Seepage Basin: Environmental information document.** Pekkala, R.O.; Jewell, C.E.; Simmons, R.V.; Marine, I.W.; Holmes, W.G. (Savannah River Lab., Aiken, SC (USA)). Dec 1986. Contract AC09-76SR00001. 198p. NTIS, PC A09/MF A01; 1; GPO Dep. File Number DE87010177.

This document provides environmental information on postulated closure options for the Ford Building Seepage Basin at the Savannah River Plant and was developed as background technical documentation for the Department of Energy's proposed Environmental Impact Statement (EIS) on waste management activities for groundwater protection at the plant. The results of groundwater and atmospheric pathway analyses, accident analysis, and other environmental assessments discussed in this document are based upon a conservative analysis of all foreseeable scenarios as defined by the National Environmental Policy Act (40 CFR 1500 to 1508). The scenarios do not necessarily represent actual environmental conditions. This document is not meant to be used as a regulatory closure plan or any other regulatory document to comply with required federal or state environmental regulations.

33727 **(DPST—85-710) Old TNX Seepage Basin: Environmental information document.** Dunaway, J.K.; Johnson, W.F.; Kingley, L.E.; Simmons, R.V.; Bledsoe, H.W.; Smith, J.A. (Savannah River Lab., Aiken, SC (USA)). Dec 1986. Contract AC09-76SR00001. 137p. NTIS, PC A07/MF A01; 1; GPO Dep. File Number DE87010172.

This document provides environmental information on postulated closure options for the Old TNX Seepage Basin at the Savannah River Plant and was developed as background technical documentation for the Department of Energy's proposed Environmental Impact Statement (EIS) on waste management activities for groundwater protection at the plant. The results of groundwater and atmospheric pathway analyses, accident analysis, and other environmental assessments discussed in this document are based upon a conservative analysis of all foreseeable scenarios as defined by the National Environmental Policy Act (40 CFR 1500-1508). The scenarios do not necessarily represent actual environmental conditions. This document is not meant to be used as a regulatory closure plan or other regulatory document to comply with required federal or state environmental regulations.

52 ENVIRONMENTAL SCIENCES, AQUATIC

5201 Basic Studies

REFER ALSO TO CITATION(S) 33651, 33652, 33699, 33701, 33703, 33709, 33710, 33864, 33865

33728 (CONF-8510249—Vol.2, pp 553-564) **Water-depth measurement & bottom type analysis using a two-dimensional array imager.** Hollinger, A.B.; O'Neill, N.T.; Dunlop, J.D.; Cooper, M.T.; Edel, H.; Gower, J.F.R. (MONITEQ Ltd., Concord, Ontario). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

Shallow water digital mapping and bottom type classification experiments have been carried out with an airborne imaging spectrometer. Such mapping relies on the variation of water color with water depth, water quality and bottom type. Typically shallow waters are redder than deep waters which are blue-green in color. A detailed characterization of the water mass depends on accurate spectro-radiometry of the low level intensities that are inherent in water scenes. The imaging spectrometer used is a prototype sensor capable of providing both high spectral resolution (about 2.6 nanometers) and high angular resolution (about 1 milli-radian). Imager characteristics and results of the data acquired and processed for an experiment carried out in a shallow coastal region will be presented. 2 references, 7 figures, 1 table.

33729 (CONF-8510249—Vol.2, pp 573-580) **Estimation of surface water potential through remote sensing and other land base information system.** Ghosh, T.K. (Indian Institute of Technology, Bombay, India). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

Remotely sensed data mainly derived through the analysis of the LANDSAT-1 Data of two dates 1975 and 1981 and further combined with the air photo interpretation along with the relevant hydrological parameters have been successfully utilized to assess the surface water availability of the parts of the Gadchiroli district, Maharashtra, India. In this investigation, a runoff model was constructed to arrive at to determine the actual components involved. 2 figures, 2 tables.

33730 (CONF-8510249—Vol.2, pp 891-896) **Aspects of flood studies of Sahibi river basin using remotely sensed data.** Kumthekar, M.B.; Alasingrachar, M.A. 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

The study illustrates the use of Landsat preflood and postflood coverages of Sahibi river basin in Rajasthan, India, during the year 1977; when there was unprecedented flood in parts of Rajasthan, Haryana and territory of Delhi. Flood boundary delineation was accomplished by adopting digital techniques to classify areas of deep water, shallow water, wet lands and land with some moisture. Superimposing the preflood data on the postflood data, the flood areas were demarcated. Temporal composite techniques were also attempted using optronics colormation system, to delineate the flood areas. The best result was obtained by band 7 of preflood coverage with red filter projected on band 7 of post-flood coverage with green filter. The land use in flooded areas was determined using the stretched and unstretched data in generating the color composites on the colormation system. 4 references, 3 figures.

33731 (CONF-8510249—Vol.2, pp 909-918) **Effect of thematic mapper spectral properties on land cover mapping for hydrologic modeling.** Gervin, J.C.; Lu, Y.C.; Gauthier, R.L.; Miller, J.R.; Irish, R.R. (NASA/Goddard Space Flight Center, Greenbelt, MD). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

In a cooperative program with the US Army Corps of Engineers (USACE), NASA is evaluating the capabilities of Landsat-4 Thematic Mapper (TM) data for environmental and hydrological applications. Both NASA and USACE are interested in assessing the relative effectiveness of TM, MSS and conventional data for land cover classification, particularly in urban/suburban areas, and for developing parameters for input to flood forecasting and flood damage models. In addition, it would be particularly desirable to establish a set of optimal TM band combinations for land cover classification and related data analysis which could reduce processing time and cost while preserving accuracy and reliability. 22 references, 4 tables.

33732 (CONF-8510249—Vol.2, pp 919-928) **HF radar measurements of surface currents in the lower Delaware Bay.** Driver, D.B. (Coastal Engineering Research Center, Vicksburg, MS). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

A shore-based, high frequency (HF) radar was used to monitor surface currents over much of the lower Delaware Bay. The radar, known as CODAR (Coastal Ocean Dynamics Applications Radar), measures and employs the Doppler spectrum of the sea-echo signal to extract radial surface currents over a large spatial area. Two separate sites were established to provide overlapped coverage, thereby enabling the determination of total velocity vectors. The project, a joint effort with the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), was designed for the two-fold purpose of demonstrating the operational utility and accuracy of CODAR for monitoring both the spatial and temporal variability of surface currents and to instruct Coastal Engineering Research Center (CERC) personnel in operational procedures and interpretation of output. Two-dimensional maps of total current vectors were produced every 1.5 hours for a period of 3 weeks. Assessment of system accuracy is still under investigation. 3 references, 7 figures.

33733 (CONF-8510249—Vol.2, pp 929-938) **Analysis of different algorithms for sea surface temperature retrieval from AVHRR data.** Cannizzaro, G.; Ricottilli, M.; Ulivieri, C. (Telespazio, Roma, Italy). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

A critical review of a great number of split-window algorithms capable to correct NOAA/AVHRR 11 micron (Channel 4) data for atmospheric attenuation by the use of the differential absorption properties of the two AVHRR adjacent channels (Channels 4 and 5) in the 11 micron window region has been performed. This review has implied the following steps: (1) a literature review of the algorithms with the aim of singling out (i) the algorithm structure (spectral bands considered, number of free parameters, etc.) and type (simulation and/or regression); (ii) the environmental conditions of validity of the algorithm (geometric, geographic, meteo-climatological, oceanographic, etc.) and (iii) the reported accuracy figures; (2) an analysis of the difference of the algorithm outputs as a function of input data has been performed and conclusions on their applicability for sea surface temperature determination have been drawn. 27 references, 1 figure, 4 tables.

33734 (CONF-8510249—Vol.2, pp 939-946) **Near real-time data system for satellite passive microwave ice maps.** Thirkettle, F.W. (Ph.D. Associates Inc., Toronto, Ontario). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

The Scanning Multifrequency Microwave Radiometer (SMMR) operating on an alternate day basis onboard the US NASA NIMBUS-7 satellite has been utilized for the all weather, day and night remote sensing of sea ice. A near real-time data collection, analysis, display and distribution system functioning in an operational mode was developed by Ph.D. Associates Inc. for the sea ice product. The system begins with the selective retrieval of the previous day SMMR brightness temperature data from the NODDS (National Oceanic Data Distribution System) computer system in Monterey, California and terminates four hours later with the transmission, by facsimile, of 8 by 10 inch submaps containing geographically located and computer generated ice concentration contours. This operational system allows the user flexibility in the display of the final product and has been successfully employed in the support of a number of campaigns. 13 references, 2 figures.

33735 (CONF-8510249—Vol.2, pp 947-960) **Computer-assisted techniques for geophysical analysis of SAR sea-ice imagery.** Burns, B.A.; Jentz, R.R.; Caruthers, C.G.; Lyden, J.D.; Jackson, P.L. (Environmental Research Institute of Michigan, Ann Arbor). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

Computer-assisted techniques have been developed to obtain geophysical parameters from synthetic aperture radar (SAR) image data of sea ice. The algorithms developed to produce estimates of ice field motion, floe size distribution and ice concentration utilize varying degrees of manual interpretation integrated with mini-computer and micro-computer computations. These techniques are illustrated with applications to data obtained during the 1983 and 1984 Marginal Ice Zone Experiments. 3 references, 11 figures.

33736 (CONF-8510249—Vol.2, pp 961-970) **NIMBUS-7 microwave radiometry of ocean surface winds and sea ice.** Rubinstein, I.G.; Bunn, F.E.; Ramseier, R.O. (Ph.D. Associates Inc., Toronto, Ontario). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

Passive microwave imagery from satellite sensors first became available with the 19 GHz horizontal polarization radiometer carried on the NIMBUS-5 satellite launched in 1972. Continuity has been provided with the 1978 launch of five frequency dual polarization radiometers (6, 10, 18, 21, & 37 GHz) on the SEASAT and the NIMBUS-7 satellites. Still operational, NIMBUS-7 will be replaced with the launch of a DMSP satellite in 1986 carrying a four frequency dual polarization radiometer (19, 22 single polarized, 37 & 85 GHz). This paper describes the development and validation of algorithms used to obtain wind speed over open oceans, and sea-ice concentration/ice age. This work primarily involves the NIMBUS-7 Scanning Multichannel Microwave Radiometer - SMMR (NIMBUS-5, SEASAT, and simulated DMSP radiometer data also have been studied). 13 references, 8 figures, 1 table.

33737 (CONF-8510249—Vol.2, pp 971-980) **Ground-based system for sensing radiometric properties of snow, ice, and water.** Steyn-Ross, D.A.; Moreau, T.A.; Cameron, M. (Ph.D. Associates Inc., Toronto, Ontario). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

Described is a microcomputer-controlled data acquisition system designed for ground-based infrared and microwave radiometry of snow, ice, and water. The radiometric sensors are mounted on a two-axis platform to enable the target area to be scanned in both azimuth and elevation. Data from these sensors, together with information retrieved from an array of bead thermistors and from a stand-alone weather station are stored on hard disk for subsequent analysis and graphical display. The platform may be positioned automatically by the microcomputer as it reads a set of preselected pointing coordinates, or oriented manually by the operator. The system has been used in a preliminary field study at a site on the St. Lawrence River. The object of this study was to observe in detail the physical properties of snow, ice, and freshwater, relating these to the measured microwave emissions. This information would subsequently be used to validate measurements by aircraft- and satellite-borne microwave sensors, and to develop improved theories for scattering from porous materials such as snow and multiyear ice. 6 references, 9 figures.

33738 (CONF-8510249—Vol.2, pp 981-990) **Effects of spatial variability on remotely-sensed sea surface temperature.** Gasparovic, R.F.; Wilkerson, J.C. (John Hopkins Univ., Laurel, MD). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

Validating satellite measurements of sea surface temperature (SST) rarely involves comparing precisely coincident in situ and remote observations. Consequently, spatial variations in SST can result in measurement differences being attributed incorrectly to instrument errors. The effects of SST spatial variability are quantified using the SST structure function to estimate the expected rms temperature difference as a function of measurement separation distance. Aircraft and satellite infrared measurements are used to illustrate the magnitude and geographical dependence of these effects. Differences between in situ, point observations and remote, area-averaged measurements are also examined using satellite infrared imagery from regions surrounding moored oceanographic buoys. 11 figures.

33739 (CONF-8510249—Vol.2, pp 1045-1056) **Integration of SNOTEL data and remotely sensed snow covered area in water supply forecasting.** Shafer, B.A. (Dept. of Agriculture, Portland, OR). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

Snowmelt runoff is the major constituent of annual streamflow in the Western US. Accurate forecasts of this runoff are vital to many sectors of the region's economy. Remotely sensed snow covered area (SCA) and telemetered data from the US Soil Conservation Service's SNOTEL network are being integrated into water supply forecast procedures along with other conventional point data. Several methods are discussed for incorporating SCA and SNOTEL data into statistical and physical process models in cooperation with other federal agencies. Impediments to greater utilization of remotely sensed SCA are identified. Analysis of a 1983 flood event on the Colorado River underscores the necessity of integrating point and areal measurements in order to more fully comprehend the three dimensional nature of operational water supply forecasting. 15 references, 8 figures.

33740 (CONF-8510249—Vol.2, pp 1057-1064) **Floodplain land cover mapping using Thematic Mapper data.** Kerber, A.G.; Gervin, J.C.; Lu, Y.; Marcell, R.; Edwardo, H.A. (NASA/Goddard Space Flight Center, Greenbelt, MD). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

NASA, the US Army Corps of Engineers, Pittsburgh District and the US Army Cold Regions Research and Engineering Laboratory (CRREL) investigated the use of satellite remote sensing data to aid in food control management along the Ohio River. In order to evaluate the probable effects of selecting various management alternatives, the Corps must have accurate, up-to-date information on detailed land use. Consequently, the Corps and NASA were interested in determining whether Landsat-4 Thematic Mapper (TM) data might prove more accurate than the Multispectral Scanner (MSS) data available on previous Landsats for mapping floodplain land cover. Landsat Thematic Mapper (TM) and Multispectral Scanner (MSS) data acquired on August 19, 1982, as well as airborne TM simulator data acquired September 12, 1981, were compared for the study area of New Martinsville, West Virginia. A Level I land cover classification was performed for each data set using an unsupervised clustering approach. The TM, TMS, and MSS data sets were classified into four land cover categories - forest, agriculture/grass, developed (low density residential, high density residential/commercial, commercial/industrial), and water. A digitized ground verification map base was created on which the three classifications were overlaid to obtain a comparison of mapping accuracies. 4 references, 4 tables.

33741 (EPRI-EA—5200-Vol.1) **Compensatory mechanisms in fish populations: Literature reviews: Volume 1, Critical evaluation of case histories of fish populations experiencing chronic exploitation or impact: Final report.** Saila, S.B.; Chen, X.; Erzini, K.; Martin, B. (Rhode Island Univ., Narragansett (USA). Graduate School of Oceanography; Electric Power Research Inst., Palo Alto, CA (USA)). May 1987. 267p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920438.

This study includes case histories of certain fish species which are experiencing chronic perturbations and related literature pertaining to compensation processes. "Compensation" has been defined as the ability of fish to offset the population reduction caused by natural or man-induced stresses. Certain compensation methods are widely accepted, and include cannibalism, competition, disease, growth and predation, among others. These compensation methods are examined in relation to each fish species included in the study. Stock-recruit relationships and empirical observations of changes in growth and mortality have been the focus of much of the background on compensation. One of the conclusions drawn from this study is that a significant amount of recruitment variability exists and can be attributed to environmental (rather than compensatory) factors. The stock-recruitment problem appears to be the most significant scientific problem related to compensation in the types of fish included in this study. Results of the most recent studies of the American shad support this theory. Life histories, breeding biology and other pertinent data relating to each species included in the study will be found in the appendices.

33742 (NP—7900759) **The ecology of regularly flooded salt marshes of New England: A community profile.** Teal, J.M. (Woods Hole Oceanographic Institution, MA (USA)). Jun 1986. 75p. U.S. Fish and Wildlife Service, 1010 Gause Blvd., Slidell, LA 70458. File Number TI87900759.

The current state-of-the-art in scientific knowledge about intertidal salt marshes is presented, but restricted to one habitat in New England, specifically Great Sippewissett at Falmouth, Massachusetts. (PSB)

5202 Chemicals Monitoring And Transport

REFER ALSO TO CITATION(S) 32495, 32607, 33681

33743 (AD-A—178831/4/XAB) **Evaluation of rotary air stripping for removal of volatile organics from groundwater. Final report, 1 March 1985-1 September 1986.** Dietrich, C.; Treichler, D.; Armstrong, J. (Traverse Group, Inc., Ann Arbor, MI (USA)). Feb 1987. 88p. NTIS, PC A05/MF A01.

Rotary air stripping was researched and developed to remove volatile organic contaminants from groundwater. The Traverse Group, Inc, Ann Arbor MI, was contracted under a joint funding venture by the US Coast Guard and the US Air Force to evaluate feasibility of using rotary air stripping to treat water contaminated with benzene, toluene, xylenes, trichloroethylene, 1,2,dichloroethane, and tetrachloroethylene. A site of groundwater contamination at the US Coast Guard Station, Traverse City MI provided a readily available source of contaminated water for this work. A prototype rotary air stripper (RAS), manufactured specifically for this project, was installed onsite in Traverse City MI. The RAS (consisting of a packed-bed 1.7 feet in diameter by 1.2 feet thick) was evaluated over a range of contaminant concentrations (63 to 19,000 ppb), liquid flow rates (50 to 120 gpm), air-to-water ratios (10:1 to 170:1 vol/vol), and rotor speeds (365 to 875 rpms). The effect of each parameter on removal efficiency was analyzed. Generally, removal efficiencies in excess of 99 percent were achieved for all contaminants (except 1,2-DCE) at an air-to-water ratio and rotor speed of 30:1 vol/vol and 435 rpms, respectively.

33744 (AD-A—179005/4/XAB) **Detoxification and disposal of hazardous organic chemicals by processing in supercritical water. Final report, 1 June 1980-31 December 1981.** Modell, M. (Modar, Inc., Natick, MA (USA)). 6 Nov 1985. 83p. NTIS, PC A05/MF A01.

A new process for the destruction of hazardous waste makes use of supercritical water (SCW) as the medium for a rapid and highly efficient oxidation reaction. Destruction efficiencies of 99.99% and greater have been achieved for a broad spectrum of organic chloride compounds and solvents. This report presents the results of bench-scale tests of the SCW system on a variety of compounds that yielded information on destruction efficiency, performance capacity, reaction kinetics, fate of inorganic heteroatoms, and system corrosion.

33745 (CONF-8510249—Vol.2, pp 689-696) **Approach to the use of remote sensing for the detection of acid lakes in the Canadian shield.** Fortescue, J.A.C.; Singhroy, V.H. (Ontario Geological Survey, Toronto). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

A major problem in acid rain studies involving lakes and associated forests in the Canadian Shield is the identification of areas of stress which are characterized by having lakes which are clear and have a pH of 5.6 or less. In this paper they describe a combined limnological and remote sensing project completed during a seven-day period in August, 1984 designed to identify clear acid lakes in a test area. As expected, the interpretation of the remote sensing patterns in relation to the known location of acid lakes proved to be a difficult problem which was not solved fully at the time this paper was written. Instead they show, by example, four approaches to the solution of the problem and conclude that further work is required to solve it in such a way that remote sensing can be used as a reliable indicator of clear acid lakes in the Canadian Shield. 5 references, 3 figures, 4 tables.

33746 (CONF-8510249—Vol.2, pp 829-838) **Detecting hydrobiological parameters with Landsat 3: summer 1981 data.** Ruiz-Azuara, P. (Laboratorio Interdisciplinario, Mexico). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

A small coastal area (Lagoon Coyuca de Benitez, Gro.) with 29 km^2 was selected, some hydrobiological parameters were measured in ten sample points previously chosen and one multispectral image form Landsat 3 was acquired. The objective is to detect hydrobiological parameters in small areas with Landsat data. The sampling and the Landsat image correspond to summer 1981. The Landsat 3 image was used in two ways: making non-supervised and supervised classifications for water quality purposes and reading the reflectances Ri (i = 1, 2, 3, 4) in the four bands 4, 5, 6, 7 for small polygonal areas around the sample points. The mean values of these training fields were considered as the characteristic reflectances at the sample points. The classified images (non-supervised and supervised) from Landsat 3 MSS data showed homogeneity in the most of the lagoon. However, they obtained that the hydrobiological parameters (in situ data) like: Primary productivity, pH, Concentration of Chlorophyll a, Concentration of total suspended solids, salinity (i.e. chlorine concentration) and Secchi Disk Transparency can be correlated with Landsat MSS data. The statistical models obtained by multiple linear regression showed high coefficients of determination (R_s). The significance level for their F values are smaller than .01 except for Chlorophyll a (around .05). 7 references, 8 figures, 6 tables.

33747 (CONF-8510249—Vol.2, pp 1035-1044) **Remote sensing - image processing for monitoring surface effects of deep seabed mining.** Zaitzeff, J.B.; Clemente-Colon, P. (National Oceanic and Atmospheric Administration, Washington, DC). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

A pilot study was initiated in June 1982 continuing to the present to evaluate the capabilities of remote sensing as an independent tool for observing the potential surface and near-surface environmental effects of ocean mining. The effort involved the acquisition and analysis of limited data sets from the National Oceanic and Atmospheric Administration Polar-Orbiter's Advanced Very High Resolution Radiometer (AVHRR) and the National Aeronautics and Space Administration Nimbus-7 Coastal Zone Color Scanner (CZCS). Because the mining sites studied are in the Intertropical Convergence Zone, extensive cloud cover through the seasons severely limits satellite visible and infrared region sensor monitoring capabilities. However, sufficient cloud-free areas were found and analyses of a small sample of both AVHRR and CZCS scenes demonstrate that deep seabed mining surface parameter indices are within present satellites capabilities for sea surface temperature and phytoplankton pigment concentrations for cloud free areas. 5 references, 7 figures, 2 tables.

33748 **(DOE/ER/13446—2) Mechanistic study of the effects of magnetic fields on scale formation: Progress report for the period September 1, 1986 to August 30, 1987.** Katz, J.L. (Johns Hopkins Univ., Baltimore, MD (USA)). Apr 1987. Contract FG02-85ER13446. 35p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87009346.

The purposes of the work reported are (1) examining the fundamental physics and processes that must be occurring if magnetic water treatment is a real phenomenon; (2) verifying whether magnetic fields can affect scale formation, at least under some circumstances; and, given verification of its existence, (3) developing a sufficiently deep understanding of the relevant processes so that magnetic water treatment may be used successfully. Through a systematic series of nucleation experiments, the supersaturation necessary to bring about $CaCO_3$ precipitation with and without various ferric hydroxide minerals present is being determined. Before-treatment/after-treatment scale samples have been analyzed from field installations where commercially manufactured magnetic devices are used. Consistent differences between the magnetically treated and the untreated samples have been noted. Experimental procedures have been designed to test the effects of a magnetic field on both the hydrolysis and oxidation processes which lead to ferric hydroxide precipitation.

33749 **(DOE/EV/02161—T3) Energy generation and the sulfur-carbon cycles: Final technical report for period March 1981 thru February 1985.** Zeikus, J.G. (Wisconsin Univ., Madison (USA). Dept. of Bacteriology). May 1987. Contract AC02-76EV02161. 10p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009612.

The aim of this research was to understand the role of anaerobic bacteria in natural and man-influenced carbon cycles in nature. The major goal was to elucidate how sulfur metabolism influenced organic decomposition in aquatic sediments. The research compared these processes in two different anaerobic ecosystems: the sulfate-depleted sediments of Lake Mendota, Wisconsin and the sulfate-saturated sediments of Great Salt Lake, Utah. The approach was both ecological and physiological, and employed both in situ characterization of carbon and sulfur metabolism with radiotracers and laboratory species isolation-characterization studies with pure and defined mixed cultures to demonstrate the prevalent environmental paths of carbon electrons, and sulfur during the anaerobic decomposition of organic matter. The significance of this research encompassed fundamental knowledge of the carbon sulfur cycles, applied knowledge on the microbial genesis of flammable gas and oil and extended knowledge on the diversity and metabolic activity of obligately anaerobic bacteria in nature. 13 refs.

33750 **(PB—87-161188/XAB) Influences of land uses and stream modifications on water quality in the streams of the Court Creek watershed.** Roseboom, D.; Evans, R.L.; Erickson, J.; Brooks, L.G.; Shackleford, D. (Illinois State Water Survey, Peoria (USA). Water Quality Section). Dec 1986. 179p. NTIS, PC A09/MF A01.

The details of the report will illustrate the importance of all agricultural lands in the outpouring of sediment and nutrients, which are degrading lakes and streams throughout the Illinois River basin. The Court Creek watershed lies in the center of this region, which the Soil Conservation Services calls the 'critical sediment producing area' of the upper Mississippi River basin. Court Creek has three large tributaries (Middle Creek, North Creek, and Sugar Creek), whose watersheds are large enough to contain permanent fish populations. In addition to looking at the amount of sediment loading to streams from agricultural lands, the report also

looks at bank erosion and stream channelization and run-off from animal confinement operations.

5203 Radioactive Materials Monitoring And Transport

REFER ALSO TO CITATION(S) 32507, 32587, 32588, 33673, 33681, 33721

33751 (CONF-860932—, pp 141-144) **Aquatic emergency response model at the Savannah River Plant.** Hayes, D.W. (Savannah River Lab., Aiken, SC). Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

The Savannah River Plant emergency response plans include a stream/river emergency response model to predict travel times, maximum concentrations, and concentration distributions as a function of time at selected downstream/river locations from each of the major SRP installations. The menu driven model can be operated from any of the terminals that are linked to the real-time computer monitoring system for emergency response.

33752 **(LBL—23301) Radon in groundwater of the Long Valley Caldera, California.** Flexser, S.; Wollenberg, H.A.; Smith, A.R. (Lawrence Berkeley Lab., CA (USA)). Apr 1987. Contract AC03-76SF00098. 32p. (CONF-8704123—1). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87010254.

From Conference on radon, radium, and other radioactivity in ground water: hydrogeologic impact and application to indoor airborne contamination; Somerset, NJ, USA (7 Apr 1987).

In the Long Valley caldera, an area of recently (~550 y) active volcanism and current seismic activity, ^{222}Rn concentrations in hot, warm, and cold spring waters have been measured since 1982. Rn contents of the waters correlate inversely with temperature and specific conductance, with high concentrations (1500 to 2500 pCi/l) occurring in dilute cold springs on the margins of the caldera, and low concentrations (12 to 25 pCi/l) in hot to boiling springs. Rn correlates only slightly with the uranium contents of the wide range of rocks which host the hydrological system feeding the springs. These environmental effects on the radon record may mask responses to small or distant seismic, volcanic, or crustal deformation events. To date, anomalous changes in water-borne Rn have been observed in connection with at least one earthquake, which occurred close to the monitoring site. This continuing study points out that an understanding of the geological setting, its associated hydrological system, and environmental influences is necessary to properly evaluate concentrations and changes in groundwater radioactivity.

33753 **(UCRL—94995) Radioiodine in kelp from western Australia.** Marsh, K.V.; Buddemeier, R.W.; Wood, W.; Smith, C. (Lawrence Livermore National Lab., CA (USA); Western Australia Univ., Nedlands; Queen Elizabeth II Medical Centre, Nedlands (Australia)). 25 Mar 1987. Contract W-7405-ENG-48. 22p. (CONF-870430—6). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009742.

From International conference on methods and applications of radioanalytical chemistry; Kona, HI, USA (5 Apr 1987).

As part of a program to survey low levels of radioactivity in the marine environment of the southern hemisphere, we have studied the distribution and uptake of ^{131}I found in the subtidal kelp Ecklonia radiata, on the west coast of Australia. Concentrations of 5 to 75 fCi/g of ^{131}I exist in this species over a considerable distance along the coast. We have characterized the principal source of the ^{131}I and found a general temporal correlation between the amount of radioiodine discharged from sewer outfalls and its concentration in kelp. Transplant experiments have enabled us to estimate uptake and depuration rates, and our results are consistent with laboratory measurements made by others.

33754 **Time resolution methodology for assessing the quality of lake sediment cores that are dated by ^{137}Cs.** Miller, K.M.; Heit, M. (Dept. of Energy, New York, NY). *Limnology and Oceanography;* **31**: No. 6, 1292-1300(Nov 1986).

A methodology is proposed for grading the utility of lake sediment cores used to reconstruct pollution histories. The observed distribution of ^{137}Cs with depth in the core is compared to that expected from independent, historic measurements of fallout deposition. The width of the ^{137}Cs peak is the core profile that corresponds to the fallout maximum of 1963, or the combined maxima of 1959 and 1963, is used to infer the inherent time resolution of the core, i.e. the ability to distinguish events in the deposition history of the watershed. The method is applied to a number of core profiles from various lakes in the US and appears to provide self-consistent results.

5205 Site Resource And Use Studies

REFER ALSO TO CITATION(S) 32618, 32619, 32697, 32703, 32704, 33945

33755 (CONF-8510249—Vol.2, pp 749-756) **Storage analysis of Malaprabha reservoir using remotely sensed data.** Managond, M.K.; Alasingrachar, M.A.; Srinivas, M.G. (Indian Institute of Technology, Bombay). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

The case study illustrates the usefulness and limitations of the present day remotely sensed data in the storage analysis of the reservoir created by a straight gravity masonry dam on the Malaprabha river, a tributary to the Krishna basin in Karnataka State of India. Topographic maps of scales 1:50,000 published in 1976, aerial photographs of average scale 1:50,000 taken between 8th February, 1979 and 2nd March, 1979 and landsat data of 19th March, 1975 and 10th April, 1981 were used. Applying visual and digital analysis techniques, the land water interface was determined for different periods. The surface area of the reservoir watershed was then computed. The reservoir volume and level fluctuations were then found from the elevation-area capacity curves. Study also demonstrates a rational method of estimating the inflow into the reservoir by making the assessment of precipitation and losses using various thematic maps such as isohyetal, slope, land use and drainage all generated from the available data. 4 references, 4 figures, 1 table.

33756 **(DOE/BP—725) Natural propagation and habitat improvement: Volume 2, Idaho: Annual and final reports, 1985.** (USDOE Bonneville Power Administration, Portland, OR. Div. of Fish and Wildlife). Sep 1986. 325p. NTIS, PC A14. File Number DE87009928.

The individual reports in this volume have been separately abstracted for inclusion in the data base. The reports describe fish habitat enhancement projects on the Lochsa River, Eldorado and Camas Creeks, and the Clearwater River. (ACR)

33757 **(DOE/BP—759) Division of Fish and Wildlife Programs: 1986 summary.** (USDOE Bonneville Power Administration, Portland, OR. Office of Power and Resources Management). Dec 1986. 46p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87009937.

This report describes the organization of the Division of Fish and Wildlife programs of Bonneville Power Administration, its budget, and research programs funded by it during FY 1986. (ACR)

33758 **(DOE/BP—01830-2) A fisheries evaluation of the Richland and Toppenish/Satus Canal fish screening facilities, Spring 1986: Annual report, 1986.** Neitzel, D.A.; Abernethy, C.S.; Lusty, E.W. (Pacific Northwest Lab., Richland, WA (USA)). May 1987. Contract AC06-76RL01830. 75p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87010555.

The fisheries evaluation phase of diversion screen effectiveness summarizes the results of work at the Richland and Toppenish/Satus Fish screening facilities (Richland Screens and Toppenish/Satus Screens) during 1986. More than 10,000 steelhead, Salmo gairdneri, and chinook salmon, Oncorhynchus tshawytscha, were released at the screen diversions. At the Richland Screens, 61% of the released steelhead were recovered and 1.1% were descaled; 93% of the spring chinook salmon were recovered and less than 1% were descaled. At the Toppenish/Satus Screens, only steelhead were evaluated for descaling; 88.9% were recovered and 23.9%

were descaled. Only steelhead were evaluated because the Yakima River fisheries managers did not expect any other smolts to occur in Toppenish Creek. Because of the acclimation conditions and the amount of time the fish had to be held before testing, some of the test population were descaled during holding and transportation. The 23.9% descaling for the test fish was compared to 26.4% for the controls.

33759 **(DOE/BP/10068—1) A biological and physical inventory of the streams within the Nez Perce Reservation: Juvenile steelhead survey and factors that affect abundance in selected streams in the lower Clearwater River basin, Idaho: Final report.** Kucera, P.A.; Johnson, D.B. (Nez Perce Tribe, Lapwai, ID (USA). Fisheries Resource Management). Feb 1987. Contract AI79-83BP10068. 281p. NTIS, PC A13/MF A01; 1; GPO Dep. File Number DE87009919.

A biological and physical inventory of selected tributaries in the lower Clearwater River basin was conducted to collect information for the development of alternatives and recommendations for the enhancement of the anadromous fish resources in streams on the Nez Perce Reservation. Five streams within the Reservation were selected for study: Bedrock and Cottonwood Creeks were investigated over a two year period (1983 to 1984) and Big Canyon, Jacks and Mission Creeks were studied for one year (1983). Biological information was collected and analyzed on the density, biomass, production and outmigration of juvenile summer steelhead trout. Physical habitat information was collected on available instream cover, stream discharge, stream velocity, water temperature, bottom substrate, embeddedness and stream width and depth. The report focuses on the relationships between physical stream habitat and juvenile steelhead trout abundance.

33760 **(DOE/BP/13381—2) Idaho habitat evaluation for off-site mitigation record: Annual report, 1985.** Petrosky, C.E.; Holubetz, T.B. (Idaho Dept. of Fish and Game, Boise (USA)). Feb 1987. Contract AI79-84BP13381. 292p. NTIS, PC A13/MF A01; 1; GPO Dep. File Number DE87009921.

Evaluation approaches to document a record of credit for mitigation were developed in 1984-1985 for most of the habitat projects. Restoration of upriver anadromous fish runs through increased passage survival at main stem Columbia and Snake River dams is essential to the establishment of an off-site mitigation record, as well as to the success of the entire Fish and Wildlife program. The mitigation record is being developed to use increased smolt production (i.e., yield) at full-seeding as the basic measure of benefit from a habitat project. The IDFG evaluation approach consists of three basic, integrated levels: general monitoring, standing crop evaluations, and intensive studies. Annual general monitoring of anadromous fish densities in a small number of sections for each project will be used to follow population trends and define full-seeding levels. For most projects, smolt production will be estimated indirectly from standing crop estimates by factoring appropriate survival rates from parr to smolt stages. Intensive studies in a few key production streams will be initiated to determine these appropriate survival rates and provide other basic biological information that is needed for evaluation of the Fish and Wildlife program. A common physical habitat and fish population data base is being developed for every BPA habitat project in Idaho to be integrated at each level of evaluation. Compatibility of data is also needed between Idaho and other agencies and tribes in the Columbia River basin. No final determination of mitigation credit for any Idaho habitat enhancement project has been attainable to date.

33761 **(DOE/BP/16726—2) Abundance, behavior, and habitat utilization by coho salmon and steelhead trout in Fish Creek, Oregon, as influenced by habitat enhancement: Annual report, 1985.** Everest, F.H.; Reeves, G.H.; Sedell, J.R.; Wolfe, J.; Hohler, D.; Heller, D.A. (Forest Service, Corvallis, OR (USA). Forestry Sciences Lab.; Mount Hood National Forest, Estacada, OR (USA). Estacada Ranger District; Forest Service, Gresham, OR (USA)). Oct 1986. Contract AI79-84BP16726. 108p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE87009923.

Construction and evaluation of salmonid habitat improvements on Fish Creek, a tributary of the upper Clackamas River, is designed to increase the annual number of chinook and coho salmon, and steelhead trout smolt outmigrants. The primary objectives of the evaluation include the: (1) evaluation and quantification of changes in salmonid spawning and rearing habitat resulting from a variety of habitat improvements; (2) evaluation and quantification of changes in fish populations and biomass resulting from habitat improvements; and (3) evaluation of the cost-effectiveness of habitat improvements developed with BPA and Forest Service funds on Fish Creek. This report focuses on the projects completed in the basin in 1983, 1984, and 1985, and their evaluation.

33762 **(DOE/BP/34796—3) Feeding activity, rate of consumption, daily ration and prey selection of major predators in John Day Reservoirs: Annual report, 1986.** Poe, T.P.; Palmer, D.E.; Hansel, H.C.; Vigg, S.; Lofy, P.T.; Duke, S.D.; Parsley, M.J.; Prendergast, L.A.; Burkhart, R.; Burley, C. (Fish and Wildlife Service, Cook, WA (USA). Willard Field Station). Feb 1987. Contract AI79-82BP34796. 58p. NTIS, PC A04/MF A01; GPO Dep. File Number DE87009910.

This report summarizes activities in 1986 to determine the significance of predation on juvenile salmonids in John Day Reservoir. Salmonids were the single most important food item (by weight) for northern squawfish (Ptychocheilus oregonensis) at McNary tailrace during all sampling periods and at John Day forebay during July. Salmonids accounted for 23.7% of the diet of walleye (Stizostedion vitreum vitreum) in July 1986, which was higher than in previous years (although the sample size examined was low). Salmonids contributed little to smallmouth bass (Micropterus dolomieui) diet but comprised about 25% of the diet of channel catfish (Ictalurus punctatus). Composition of prey taxa in beach seine catches in July 1986 was similar to previous years with chinook salmon (Oncorhynchus tschawytscha), largescale sucker (Catostomus macrocheilus), and sand roller (Percopsis transmontana) dominating the catch.

33763 **(DOE/BP/39461—T1) Yakima River spring chinook enhancement study: Annual report, FY 1986.** Fast, D.E.; Hubble, J.D.; Watson, B.D. (Yakima Indian Nation, Toppenish, WA (USA)). Nov 1986. Contract AI79-83BP39461. 206p. NTIS, PC A10/MF A01; 1; GPO Dep. File Number DE87009902.

A total of eight spring chinook redds were successfully capped in 1986. The mean survival to emergence was 56.7% and ranged from 21.9 to 90.0%. The spring outmigration at Wapatox was estimated to be 6671 smolts. The 1986 outmigration of wild spring chinook from the Yakima Basin was estimated to be 169,076 smolts at Prosser. The survival from egg to smolt was 4.6%, which gives a mean egg to smolt survival over four years of 5.1%. In 1986 a total of 8557 adult and 349 jack spring chinook salmon returning to the Yakima River were counted at Prosser fish ladder. An additional 530 fish were estimated to have been caught in the Yakima River subsistence dipnet fishery below Horn Rapids and Prosser Dams. This was the largest return of spring chinook salmon to the Yakima River in 29 years. The smolt to adult (S/sub sa/) survival was estimated to be 6102 wild three, four, and five year old fish returned from an estimated smolt outmigration of 135,548 fish in 1983. This gives an estimated survival from smolt to adult of 4.4%.

33764 **(DOE/BP/64321—1) Camas Creek (Meyers Cove) anadromous species habitat improvement plan: Final report.** May, B.; Rose, R.W. (Forest Service, Salmon, ID (USA). Salmon National Forest). Dec 1986. Contract AI79-86BP64321. 35p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87009901.

This report represents an analysis of potential enhancement and management options designed to improve instream and riparian zone conditions in the Meyers Cover area of Camas Creek. The efforts expended will contribute to improvement of anadromous species spawning, incubation and rearing habitat. Potential production increases would provide some compensation for hydropower effects in other areas of the Columbia River basin.

33765 **(NP—7900660) Habitat suitability index models: American alligator.** Newsom, J.D.; Joanen, T.; Howard, R.J. (Professional Wildlife Service, Baton Rouge, LA (USA); Louisiana Dept. of Wildlife and Fisheries, Grand Chenier, LA (USA). Rockefeller Wildlife Refuge; Fish and Wildlife Service, Slidell, LA (USA). National Wetlands Research Center). Apr 1987. 23p. US Fish and Wildlife Service, 1010 Gause Blvd., Slidell, LA 70458. File Number TI87900660.

This model is intended for use in environment impact assessments and habitat management, especially for energy source development proposals.

53 Assessment Of Energy Technologies

REFER ALSO TO CITATION(S) 32698, 32699, 33655, 33725, 33727

55 BIOMEDICAL SCIENCES, BASIC STUDIES

5501 Behavioral Biology

33766 **(LA-UR—87-1275) A layered network model of sensory cortex.** Travis, B.J. (Los Alamos National Lab., NM (USA)). 1986. Contract W-7405-ENG-36. 50p. (CONF-8608178—1). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87008998.

From 3. international conference on computer simulations in brain science; Copenhagen, Denmark (1 Aug 1986).

An integrated computational approach to modeling sensory systems which couples realistic layered neural models of sensory cortex and midbrain nuclei to detailed models of the sense organs (e.g., retina or cochlea) is described. The approach is applied to the auditory system. Through an exercise of the model, it is shown that spatial location of sounds may be a natural consequence of the way cochlear response is mapped onto the cortex. 31 refs., 23 figs., 3 tabs.

5502 Biochemistry

REFER ALSO TO CITATION(S) 32622, 32626, 32627, 32629, 32630, 32631, 33775, 33862

33767 **(DOE/ER/13352—2) Characterization of plant plasma membrane antigens: [Annual] progress report.** Galbraith, D.W.; Afonso, C.L.; Meyer, D.; Harkins, K.R. (Nebraska Univ., Lincoln (USA)). 21 Apr 1987. Contract FG02-85ER13352. 6p. NTIS, PC A02/MF A01. File Number DE87008441.

Protoplast plasma membranes were used to raise antibodies in mice to cell surface antigens. Monoclonal antibodies were selected from those produced and used for indirect immunofluorescence microscopic analysis of N. tabacum cells. In parallel studies cDNA expression libraries were prepared. (DT)

33768 **(LA-UR—87-1789) Sources of data in the GenBank database.** Burks, C. (Los Alamos National Lab., NM (USA)). 1987. Contract W-7405-ENG-36. 12p. (CONF-8705105—2). NTIS, PC A02/MF A01; GPO Dep. File Number DE87010137.

From 1. CODATA workshop on nucleic acid and protein sequencing data; Gaithersburg, MD, USA (3 May 1987).

The citations in GenBank are characterized with respect to form of publication. The potential spectrum of quality control problems applicable to the various types of unpublished data are discussed. 6 refs., 2 tabs.

33769 **Response of cytosolic-isozyme and plastid-isozyme levels of 3-deoxy-D-arabino-heptulosonate 7-phosphate synthase to physiological state of Nicotiana silvestris in suspension culture.** Ganson, R.J.; Jensen, R.A. (State Univ. of New York, Binghamton). *Plant Physiology;* **83**: No. 3, 479-482(Mar 1987). Contract AC02-78ER04967.

Two isozymes of 3-deoxy-D-arabin0-heptulosonate 7-phosphate synthase are partitioned into plastic (DS-Mn) and cytosolic (DS-Co) compartments of at least several higher plants. Differential variation of isozyme levels and in the timing of their expression was observed during growth of Nicotiana silvestris in suspension culture. The ratio of DS-Co to DS-Mn varied about fivefold in comparison of the different physiological stages of growth. Cultures maintained in exponential phase for >10 generations (EE cells) possessed balanced-growth properties and did not exhibit the considerable variation of isozyme levels found during the initial 2 to 3 generations of exponential growth (E cells) that followed subculture of stationary-phase cultures. The plastid isozyme level declined substantially in stationary phase, responded immediately to subculture, and reached a peak in early exponential growth similar to the steady-state level of DS-Mn in EE cells. In contrast, the cytosolic isozyme level peaked in late exponential growth. A recent history of stationary-phase physiology appeared to foster elevated synthesis of DS-Co since the steady-state level of DS-Co in EE cells was much lower than in E cells.

33770 **Biogenesis of photosystem II complexes: transcriptional, translational, and posttranslational regulation.** Jensen, K.H.; Herrin, D.L.; Plumley, F.G.; Schmidt, G.W. (Univ. of Georgia, Athens). *Journal of Cell Biology;* **103**: No. 4, 1315-1325(Oct 1986). Contract FG09-84ER13188.

The integral membrane proteins of photosystem II (PS II) reaction center complexes are encoded by chloroplast genomes. These proteins are absent from thylakoids of PS II mutants of algae and vascular plants as a result of either chloroplast or nuclear gene mutations. To resolve the molecular basis and the concurrent absence of the PS II polypeptides, protein synthesis rates and mRNA levels were measured in mutants of Chlamydomonas reinhardtii that lack PS II. The analyses show that one nuclear gene product regulates the levels of transcripts from the chloroplast gene encoding the 51-kD chlorophyll α-binding polypeptide (polypeptide 5) but is not involved in the synthesis of other chloroplast mRNAs. The other nuclear product is specifically required for translation of mRNA encoding the 32-34-kD polypeptide, D1. The absence of either D1 or polypeptide 5 does not eliminate the synthesis and thylakoid insertion of two other integral membrane proteins of PS II, the chlorophyll α-binding polypeptide of 46 kD (polypeptide 6) and the 30-kD D1-like protein, D2. However, these two unassembled subunits cannot be properly processed and/or are degraded in the mutants even though they reside in the membrane. In addition, pulse labeling of the nuclear mutants and a chloroplast mutant that does not synthesize D1 mRNA indicates that synthesis of polypeptide 5 and D1 is coordinated at the translational level. A model is presented to explain how absence of one of the two proteins could lead to translational arrest of the other.

5503 Cytology

REFER ALSO TO CITATION(S) 33767

33771 (LBL—20345, pp 15-17) **In vitro maturation of bone marrow megakaryocytes.** Leven, R.M.; Yee, M.; Tanguilig, C.L. Apr 1986. NTIS, PC A12/MF A01. File Number DE86012736.

In Biology and Medicine Division annual report, 1985.

Studies are reported showing that a poorly defined factor in the plasma of thromobocytophenic rabbits, as compared to that of controls, can stimulate morphological change in bone marrow megakaryocytes thought to be similar to that which occurs during platelet formation in vivo. The results imply a possible mechanism for the compensation for thrombocytopenia through the direct action of a humoral agent on mature megakaryoctyes, stimulating their platelet forming activity.

33772 (LBL—20345, pp 17-18) **Relationship between megakaryocyte size and ploidy in mice during recovery from acute immunothrombocytopenia.** Ebbe, S.; Yee, T.; Carpenter, D.; Phalen, E. Apr 1986. NTIS, PC A12/MF A01. File Number DE86012736.

In Biology and Medicine Division annual report, 1985.

The size and ploidy of individual mouse megakaryocytes of a defined morphological class were compared from 4 hours to 4 days after thrombocytopenia was produced by an injection of

guinea pig antimouse platelet serum. Results of the studies show that the main cause of macrocytosis of megakaryocytes in response to the stimulatory effect of acute thrombocytopenia is a shift to higher nuclear DNA content.

33773 (LBL—20345, pp 19) **Thrombocytopoietic response to immunothrombocytopenia in nude mice.** Ebbe, S.; Levin, J.; Miller, K.; Yee, T.; Levin, F.; Phalen, E. Apr 1986. NTIS, PC A12/MF A01. File Number DE86012736.

In Biology and Medicine Division annual report, 1985.

A report is presented of experiments which show that the response to acute thrombocytopenia was the same in T cell deficient nude mice as in normal controls. This suggests that T cells do not play an important role in these processes.

33774 **Structure of plant cell walls: XIX. Isolation and characterization of wall polysaccharides from suspension-cultured Douglas fir cells.** Thomas, J.R.; McNeil, M.; Darvill, A.G.; Albersheim, P. (Univ. of Georgia, Athens). *Plant Physiology;* **83**: No. 3, 659-671(Mar 1987).

The partial purification and characterization of cell wall polysaccharides isolated from suspension-cultured Douglas fir (Pseudotsuga menziesii) cells are described. Extraction of isolated cell walls from 1.0 M LiCl solubilized pectic polysaccharides with glycosyl-linkage compositions similar to those of rhamnogalacturonans I and II, pectic polysaccharides isolated from walls of suspension-cultured sycamore cells. Treatment of LiCl-extracted Douglas fir walls with an endo-α-1,4-polygalacturonase released only small, additional amounts of pectic polysaccharide, which had a glycosyl-linkage composition similar to that of rhamnogalacturonan I. Xyloglucan oligosaccharides were released from the endo-α-1,4-polygalacturonase-treated walls by treatment with an endo-β-1,4-glucanase. These oligosaccharides included hepta- and nonasaccharides similar or identical to those released from sycamore cell walls by the same enzyme, and structurally related octa- and decasaccharides similar to those isolated from various angiosperms. Finally, additional xyloglucan and small amounts of xylan were extracted from the endo-β-1,4-glucanase-treated walls by 0.5 N NaOH. The xylan resembled that extracted by NaOH from dicot cell walls in that it contained 2,4- but not 3,4-linked xylosyl residues. In this study, a total of 15% of the cell wall was isolated as pectic material, 10% as xyloglucan, and less than 1% as xylan. The noncellulosic polysaccharides accounted for 25% of the cell walls, cellulose for 23%, protein for 34%, and ash for 5%, for a total of 88% of the cell wall.

5504 Genetics

REFER ALSO TO CITATION(S) 33866

33775 **(DOE/ER/13071—T1) Molecular approaches to genomic organization: Progress report, 5/15/86 to 5/14/87.** Rubenstein, I.; Phillips, R.L. (Minnesota Univ., St. Paul (USA). Dept. of Genetics and Cell Biology). 1987. Contract AC02-83ER13071. 3p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010645.

Restriction fragment length polymorphisms were used to map the chromosomal position of genes for zein in maize. For the purpose of providing probes to uncover RFLPs we have created several large cDNA libraries. We have demonstrated that our techniques are able to determine the chromosomal location of genes with the use of DNA obtained from aneuploid plants. This has been done for the 27 kd zein-associated-protein. The in situ hybridization experiments have demonstrated preliminary evidence for the broad genomic distribution of a repeated sequence which was isolated contiguous to a zein sequence.

5505 Metabolism

REFER ALSO TO CITATION(S) 33749, 33869, 33951, 33954

33776 **Modification of lypophilic groups and replacement of phosphorus by arsenic to study the effect on myocardial specificity of radioiodinated phosphonium cations.** Srivastava, P.C.; Owen, B.A.; Knapp, F.F. Jr. (Nuclear Medicine Group, Oak Ridge National Lab., Oak Ridge, TN). *Journal of Nuclear Medicine;* **25**: No. 5, 31(1984). (CONF-840619—). Contract W-7405-ENG-26.

From 31. annual meeting of the Society of Nuclear Medicine; Los Angeles, CA, USA (5 Jun 1984).

The organic cation, (E-1-iodo-1-penten-5-yl)triphenylphosphonium iodide (I), shows attractive myocardial uptake and retention in rats and dogs. The effect of modification of lypophilic groups attached to phosphorus and replacement of phosphorus by arsenic on myocardial specificity and retention of radioiodinated cations has now been evaluated. Triphenylarsonium (II, M=As), dicyclohexylphenylphosphonium (III, M=P) and dimethyl-n-octylphosphonium (IV, M=P) cations ([R/sub 3/M/sup +/-(CH/sub 2/)/sub 3/-CH=CH*I]I/sup -/) attached to the E-1-[/sup 125/I]iodo-1-pentenyl group were prepared via NaI-chloramine T iodination of the corresponding vinylboronic acid cation substrates. Compounds I-IV and the respective precursors were analyzed (TLC, NMR, and C&H) and /sup 125/I analogs I-IV were evaluated in rats (5/group). All four agents showed good uptake and retention demonstrating that these structural alterations do not greatly affect the myocardial specificity of these interesting new agents.

33777 **Comparative dual tracer studies of β-methyl-(1-C-14)heptadecanoic acid (BMHDA) and 15-p-(I-131)-iodophenyl-β-methyl pentadecanoic acid (BMPDA) in hypertensive rats.** Yamamoto, K.; Som, P.; Brill, A.B.; Yonekura, Y.; Goodman, M.M.; Knapp, F.F. Jr.; Elmaleh, D.R.; Strauss, H.W. (Brookhaven National Lab., Upton, NY). *Journal of Nuclear Medicine;* **25**: No. 5, 31(1984). (CONF-840619—). Contract AC02-76CH00016;W-7405-ENG-26.

From 31. annual meeting of the Society of Nuclear Medicine; Los Angeles, CA, USA (5 Jun 1984).

C-11 labeled BMHDA, a branched chain fatty acid, has been reported to be a potential myocardial metabolic tracer for positron emission tomography (PET). The authors have studied the distribution of C-14 BMHDA and I-131 BMPDA in hypertensive rat hearts, using quantitative dual isotope autoradiographic (ARG) techniques. Dahl stain rats (blood pressure: 214+-8 mmHg) were injected with 10 μCi of C-14 BMHDA and 170 μCi of I-131 BMPDA. Just after sacrifice, hearts and lungs were removed and processed for ARG. The tissue sections (20 μm thick) were placed on x-ray film for 1 day to reveal the distribution of I-131. The 2nd exposure for C-14 was performed 3 months later to permit the decay of I-131. Selected pairs of ARG images were digitized and quantitated using a videodensitometric system. C-14 BMHDA showed very heterogeneous distribution in the hypertensive myocardium. Decreased uptake was seen in the endocardial region. I-131 BMPDA showed the same uneven distribution as C-14 BMHDA. The correlation coefficients of these two tracers distribution calculated from paired quantitative images were excellent (0.91-0.96). The data suggest that I-123 labeled BMPDA could be used as a biochemical market to measure fatty acid derangement for single photon emission tomography, and may have wider application than C-11 BMHDA which is limited due to availability of PET devices.

5506 Medicine

REFER ALSO TO CITATION(S) 32936, 33777, 33869, 33898, 33918, 33919, 33920, 33921, 33924, 33933, 33934, 33935, 33936, 33936, 33937

33778 (INIS-mf—10904, pp 465) **Adjuvant postoperative chemotherapy with Ftorafur and Mitomycin C with or without radiotherapy in colorectal carcinomas.** Hietanen, T. (Tampere Univ., Finland. Central Hospital). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33779 (INIS-mf—10904, pp 465) **Adenocarcinoma of the rectum: pre or post-operative adjuvant radiotherapy.** Bosset, J.F.; Mantion, G.; Arbez-Gindre, F.; Camelot, G.; Gillet, M.; Pelissier, E.; Schraub, S. (Hopital Jean Minjoz, Besancon, France). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33780 (INIS-mf—10904, pp 466) **'Sandwich' vs. postoperative pelvic radiotherapy in resectable rectal cancer: preliminary results of a prospective randomized trial.** Carallari, A.; Cosimelli, M.; Ambesi, F. (Regina Elena Cancer Inst., Rome, Italy). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33781 (INIS-mf—10904, pp 466) **Role of radiotherapy in the treatment of colorectal carcinoma.** Konstantinovic, M.; Bilic, J.; Perhat, V.; Talijancic, B.; Bakovic, M. (Clinical Centre for Oncology and Radiotherapy, Split, Yugoslavia; Military Hospital, Split, Yugoslavia. Surgery Dept.). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33782 (INIS-mf—10904, pp 466) **Surgical approaches and techniques of multiple field matching and intraoperative irradiation of intraabdominal, retroperitoneal and pelvic tumors.** Hoekstra, H.J.; Kinsella, T.J.; Miller, R.W.; Sindelar, W.F. (National Cancer Inst., Bethesda, MD, USA). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33783 (INIS-mf—10904, pp 466) **Surgery and post-operative radiotherapy for colorectal cancer extending to adjacent organs with or without perforation.** DeLuca, F.; Ragins, H.; Flax, H.; Alpert, S.; Migliorelli, F.; Lowy, S.; Barba, J.; Stacey, P.; Ghossein, N.A. (Cabrini Medical Center, New York, USA; Albert Einstein Coll. of Medicine, Bronx, NY, USA). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33784 (INIS-mf—10904, pp 234) **Tumor proliferation and overall time in radiotherapy.** Fowler, J.F. (Mount Vernon Hospital, Northwood, England). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33785 (INIS-mf—10904, pp 47) **Combination of dibromodulcitol with X-irradiation increases the lifespan of mice bearing experimental brain tumors.** Hidvegi, E.J.; Perlaky, L.; Fonagy, Anna; Institoris, L.; Afra, D. (Chinoin Gyogyszer es Vegyeszeti Termekek Gyara Rt., Budapest, Hungary). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33786 (INIS-mf—10904, pp 48) **Experimental bases and clinical results of alternating chemotherapy and multiple-fraction daily radiotherapy.** Mauro, F.; Tirindelli, D.; Arcangeli, G.; Righini, R.; Looney, W.B. (Comitato Nazionale per l'Energia Nucleare, Casaccia, Italy; Istituto Medico e di Ricerche Scientifica, Rome, Italy; Virginia Univ., Charlottesville). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33787 (INIS-mf—10904, pp 233) **Therapeutic gain factors determined for spontaneous tumors of the C3H mouse treated by fractionated radiation using fast neutrons or photons + HPO.** Suit, H.D.; Sedlacek, R.S.; Silver, G.; Hsieh, C.; Epp, E.R.; Ngo, F.; Roberts, W.; Verhey, L.J. (Massachusetts General Hospital, Boston; GLANTA, Cleveland Clinic, OH). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33788 (INIS-mf—10904, pp 462) **Neck node metastases from unknown primary tumors.** Vermund, H. (Wisconsin Univ., Madison). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33789 **(INIS-mf—10904) Proceedings of the 14. International cancer congress held at Budapest, Hungary, 21-27 Aug 1986 v. 1. Abstracts of lectures, symposia and free communications.** Eckhardt, S. (ed.). (Karger (S.) AG, Basel (Switzerland)). 1986. 479p. (CONF-8608169—Vol.1-Absts.). NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300.

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

The volume contains abbreviated forms or abstracts of lectures and contributions delivered at the 14th International Cancer Congress held between 21-27 August, 1986 in Budapest, Hungary. Altogether, more than 5000 papers were presented. About 250 items falling in the INIS scope are indexed separately. Volume 1 contains about 1840 titles with abstracts of the majority of papers.

33790 (INIS-mf—10904, pp 32) **Radical irradiation (RT) versus radical irradiation plus hyperthermia (HT) in the treatment of N_3(TNM-UICC) metastatic neck nodes: preliminary report of a prospective randomized clinical trial.** Valdagni, R.; Ambrosini, G.; Amichetti, M.; Bolner, A.; Fellin, G.; Pani, G.; Gosetti, G.; Piffer, S. (Istituti Ospedalieri, Trento, Italy). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33791 (INIS-mf—10904, pp 32) **Radiotherapy employing three fractions each day over a continuous period of 12 days.** Saunders, M.I.; Dische, S. (Mount Vernon Hospital, Northwood, England). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33792 (INIS-mf—10904, pp 48) **Cyclophosphamide as a radiosensitizer in mice study.** Yamashita, T.; Mochizuki, Y.; Hayakawa, Y.; Gomi, M.; Takagi, K.; Aoyagi, Y. (Jikei Univ., Tokyo, Japan). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33793 (INIS-mf—10904, pp 49) **Combined radiotherapy (RT) and chemotherapy (CT) in the management of unresectable, limited lung cancer.** Arriagada, R.; Le Chevalier, T. (Institute Gustave Roussy, and the GROP, Paris, France). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33794 (INIS-mf—10904, pp 218) **Effect of radiotherapy and combination therapy with PSK for transplanted mouse tumor.** Mikuriya, Shuichi; Ohami, H. (Nippon Medical School, Tokyo, Japan). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33795 (INIS-mf—10904, pp 220) **Radiochemotherapy of accelerated phase and blast crisis of chronic granulocytic leukemia.** Petrov, L. (Oncology Institute, Cluj-Napoca, Romania). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33796 (INIS-mf—10904, pp 222) **Radiotherapy in the conservative treatment of breast cancer.** Mendez, J.; Lorusso, A.; Gualdi, G.; Modica, M. di; Lanfranchi, M.; Forciniti, A. (Instituto Bancario, Buenos Aires, Argentina). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33797 (INIS-mf—10904, pp 222) **Conservative treatment of breast cancer: percutane irradiation after tumorectomy.** Stadler, B.; Staffen, A.; Strasser, K.; Wrba, F. (Vienna Univ., Austria). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33798 (INIS-mf—10904, pp 222) **Treatment of locally advanced breast cancer.** Yarom, J.; Borovik, R.; Palti, S.; Robinson, E. (Technion-Israel Institute of Technology, Haifa, Israel). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33799 (INIS-mf—10904, pp 223) **Effect of postoperative radiotherapy (XRT) on the feasibility of optimal dose adjuvant chemoterapy (CHTX) in stage II breast cancer.** Brufman, G.; Sulkes, A.; Biran, S. (Hebrew Univ., Jerusalem, Israel). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33800 (INIS-mf—10904, pp 223) **Minimal breast cancer - therapeutical proposals.** Verdier, O.; Bigozzi, M.; Gaggiolo, M.; Alvarez, S.; Querol, I.; Balatti, S. (Instituto Bancario, Buenos Aires, Argentina). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33801 (INIS-mf—10904, pp 223) **Conservative treatments of localized breast cancer: incidence of local recurrence according to the surgical and radiation techniques used.** Alpert, S.; Pauporte, J.; Flax, H.; Migliorelli, F.; Stacey, P.; Bosworth, J.; Ghossein, N.A. (Albert Einstein College of Medicine, Bronx, NY; Cabrini Medical Center, NY). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33802 (INIS-mf—10904, pp 224) **Breast cancer treatment by conservation surgery and radiation - local recurrences.** Majdic, E. (Institute of Oncology, Ljubljana, Yugoslavia). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33803 (INIS-mf—10904, pp 224) **Breast conservation therapy for breast cancer.** Aron, B. (Cincinnati Univ., OH). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33804 (INIS-mf—10904, pp 224) **Effectiveness of preoperative intensive irradiation of the breast cancer.** Chikvashvili, A.M.; Vepkhvadze, R.I.; Khatiashvili, T.M.; Kopilashvili, G.S.; Gedevanishvili, E.G.; Goguadze, M.N. 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33805 (INIS-mf—10904, pp 224) **Locally advanced breast cancer treatment.** Mustacchi, G.; Milani, S.; Prassel, I. 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33806 (INIS-mf—10904, pp 225) **Experiences with altered fractionation in breast carcinoma.** Baumgartner, E. (Semmelweis Orvostudomanyi Egyetem, Budapest, Hungary). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33807 (INIS-mf—10904, pp 225) **Radiotherapy of breast cancer by means of Ra-needles after excision of the primary tumour.** Nemeskeri, Cs.; Nagykalnai, T.; Polgar, I.; Katona, E.; Nemeth, G. (Weil Emil Korhaz-Rendeloeintezet, Budapest, Hungary). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33808 (INIS-mf—10904, pp 225) **Relapse free and overall survival in nondisseminated breast cancer.** Fodor, J.; Gyenes, G. (Orszagos Onkologiai Intezet, Budapest, Hungary). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33809 (INIS-mf—10904, pp 225) **Postoperative treatment of breast cancer with high energy electron beams.** Petranyi, J.; Farago, K.; Horvath, A.; Reischl, Gy. (Orszagos Onkologiai Intezet, Budapest, Hungary). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33810 (INIS-mf—10904, pp 226) **20-year experience with Co60 irradiation of operable breast tumours.** Kaldau, F.; Farkas, J.; Fabry, L. (Orszagos Onkologiai Intezet, Budapest, Hungary). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33811 (INIS-mf—10904, pp 226) **Breast carcinoma stage III, multidisciplinary treatment.** Venturo, H.; Bruno, M.; Dosoretz, B. 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33812 (INIS-mf—10904, pp 226) **Conservative treatment of breast cancer T1 T2 N0 relevance of local boost with iridium or electrons.** Gerard, J.P.; Laroche, G. de; Montbarbon, J.F. (Centre Hospitalier, Lyon, France; Centre Leon Berard, Lyon, France). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33813 (INIS-mf—10904, pp 227) **Post-operative irradiation of breast carcinoma. Value evaluation of post-operative irradiation of hemithorax.** Trbojevic, P.; Barjaktarevic, M.; Zamurovic, J.; Kalezic, M. 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33814 (INIS-mf—10904, pp 227) **Treatment of locally advanced breast cancer by chemotherapy combined with radiation therapy or surgery.** Chu, F.C.H.; Perloff, M.; Korzun, A.; Lesnick, G. (Cancer and Leukemia Group B., Brookline, MA). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33815 (INIS-mf—10904, pp 227) **Treatment of patients with lymphedema after irradiation following breast amputation.** Tiska-Rudman, L.; Sabol, R.; Maricic, Z. (Sredisnji Institute za Tumore i Slicne Bolesti, Zagreb, Yugoslavia). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33816 (INIS-mf—10904, pp 253) **Role of altered fractionation in the radiotherapy of malignant tumors.** Gyenes, G. (Orszagos Onkologiai Intezet, Budapest, Hungary). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33817 (INIS-mf—10904, pp 458) **Combined treatment modality of oral carcinomas in a Copenhagen community in 1978-82.** Lindelov, B.; Sand Hansen, H.; Kirkegaard, J.; Bretlau, P. (Finseninstitutet, Copenhagen, Denmark; Rigshospitalet, Copenhagen, Denmark). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33818 (INIS-mf—10904, pp 458) **Influence of host parameters and innovative treatment methods in radiotherapy for laryngeal cancer.** Karim, A.B.M.F.; Njo, K.H.; Kralendonk, J.H.; Snow, G.B.; Tiwari, R.M.; Hasman, A. (Vrije Univ., Amsterdam, Netherlands). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33819 (INIS-mf—10904, pp 458) **Intra-operative interstitial brachycurietherapy with delayed afterloading and dose fractionation.** Moushmov, M. (Nauchno-Izsledovatelski Onkologichen Institute, Sofia, Bulgaria). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33820 (INIS-mf—10904, pp 459) **Combined radiotherapy and chemotherapy in the treatment of stages I and II extranodal lymphomas of the head and neck.** Kong, J.; Fuller, L.; Robbins, K.; Velasquez, W.; Sullivan-Halley, J. (Anderson, M.D. Hospital and Tumor Institute, Houston, TX). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33821 (INIS-mf—10904, pp 459) **Concurrent chemo-radiation therapy in the management of advanced head and neck cancers.** Ambrosini, G.; Amichetti, M.; Bolner, A.; Busana, L.; Fellin, G.; Gosetti, G.; Pani, G.; Piffer, S.; Valdagni, R. (Istituti Ospedalieri, Trento, Italy). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33822 (INIS-mf—10904, pp 459) **Concurrent or sequential radiation and chemotherapeutic approaches in patients with advanced carcinoma in the head and neck area.** Karim, A.B.M.F.; Snow, G.B.; Vermorken, J.B.; Waal, I. van den; Tiwari, R.M.; Versluis, R.J.J.; Kralendonk, J.H.; Hasman, A. (Vrije Univ., Amsterdam, Netherlands). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33823 (INIS-mf—10904, pp 459) **Usefulness of pre-radiation chemotherapy in the treatment of nasopharyngeal carcinoma. Clinical and experimental reports.** Tanaka, J.; Inuyama, Y.; Hosoda, H. (Keio Univ., Tokyo, Japan). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33824 (INIS-mf—10904, pp 460) **Concomitant irradiation and chemotherapy (Mitomycin C and 5-fluoro uracil) in the treatment of head and neck carcinoma. A clinical randomized trial (70 cases).** Montbarbon, J.F.; Ardiet, J.M.; Chauvin, F.; Gignoux, B.; Papillon, J. (Centre de Lutte Contre le Cancer Leon-Berard, 69 - Lyon, France). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33825 (INIS-mf—10904, pp 460) **Combined bleomycin (BLM) and radiation therapy (RT) in the treatment of oral cancers.** Gopalan, N.; Sastry, D.V.L.N.; Shanta, V.; Krishnamurthi, S. (Cancer Institute, Madras, India). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33826 (INIS-mf—10904, pp 460) **Radiotherapy of tongue cancer; an analysis of treatment results.** Kellokumpu-Lehtinen, P.; Makkonen, T.; Nordman, E. (Turku Univ., Finland). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33827 (INIS-mf—10904, pp 460) **Lonidamine and radiotherapy in head and neck cancer. Preliminary report.** Magno, L.; Terraneo, F.; Scandolaro, L.; Bertoni, F.; De Gregorio, M.; Ciottoli, G.B. (Alberti Ist., Brescia, Italy; Angelini Research Institute, Rome, Italy). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33828 (INIS-mf—10904, pp 461) **Results of radiation treatment of maxillary antrum cancer.** Wasilewski, M.; Golebiowska, D.; Nowak, G. (Centre for Oncology, Warsaw, Poland). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33829 (INIS-mf—10904, pp 461) **Radiation therapy for chemodectoma of the head and neck region.** Kawecki, A.; Bujko, K. (Instytut Onkologii, Warsaw, Poland). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33830 (INIS-mf—10904, pp 461) **Combined cytostatic (Vindesine/platinum) and radiotherapeutic treatment of squamous cell carcinomas (UICC IV) of head and neck.** Suchy, B.; Koch, K.; Mayr, A.; Jahnke, V.; Steinhilber, W. (Staedtisches Rudolf-Virchow-Krankenhaus, Berlin, Germany, F.R.). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33831 (INIS-mf—10904, pp 462) **Radiotherapy of neck nodes metastases: analysis of failures.** Bujko, K.; Hliniak, A. (Instytut Onkologii, Warsaw, Poland). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33832 (INIS-mf—10904, pp 462) **Method for radiation treatment of malignant nasopharyngeal tumors and results of its application on 228 patients.** Pandova, V.; Ganchev, M.; Naumova, Z.; Milchev, V. (Nauchno-Izsledovatelski Onkologichen Institute, Sofia, Bulgaria). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33833 (INIS-mf—10904, pp 463) **Concomitant cisplatin by continuous infusion and radiation therapy may have synergistic effects in the therapy of squamous cell carcinomas.** Rosenthal, C.J.; Rotman, M. (SUNY-Downstate Medical Center, New York, NY). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33834 (INIS-mf—10904, pp 463) **Nasopharyngeal cancer program: evaluation of adjuvant chemotherapy in patients with complete response after radiotherapy.** Rossi, A.; Molinari, R.; Marubini, E. (Consiglio Nazionale delle Ricerche, Milan, Italy; Istituto Nazionale per lo Studio e la Cura dei Tumori, Milan, Italy). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33835 (INIS-mf—10904, pp 463) **Radiation-induced reactions accompanying continuous and split-course teletherapy Co-60 in laryngeal cancer patients.** Peszynski, J.; Kozuch-Gdak, W.; Borowska, B. (Akademia Medyczna, Lublin, Poland). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33836 (INIS-mf—10904, pp 463) **Prognostic factors and staging in squamous carcinoma of the tonsil treated by radiotherapy.** Morgan, D.A.L.; Bradley, P.J. 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33837 (INIS-mf—10904, pp 464) **Multimodality treatment of advanced T_3 N_4 N/sub 0-3/ squamous cell carcinoma of the oral cavity and oropharynx.** Furlan, L.; Soba, E. (Institute of Oncology, Ljubljana, Yugoslavia). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33838 (INIS-mf—10904, pp 464) **Results of radiotherapy in epipharyngeal tumours on 200 patients.** Kocsis, B.; Kiss, B.; Pap, L.; Petranyi, J.; Csermak, K. (Orszagos Onkologiai Intezet, Budapest, Hungary). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33839 (INIS-mf—10904, pp 464) **Simultaneous cisplatin/5-FU infusion chemotherapy and radiation in head and neck cancer.** Taylor, S.G.; Murthy, A.K.; Showel, J.; Caldarelli, D.D.; Hutchinson, J.C.; Holinger, L.D.; Witt, T.R. (Rush Medical College, Chicago, IL). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33840 (INIS-mf—10904, pp 464) **Multimodal therapy in head and neck malignant tumors.** Ban, T.; Mogos, I.; Colfescu, S.; Moldovan, C.; Marin, M. (Institute of Oncology, Bucharest, Romania). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33841 (INIS-mf—10904, pp 465) **Results in treating patients with carcinoma hypopharynx by means of chemotherapy prior to irradiation.** Voskresensky, I.; Krajina, Z.; Seremet, M. (Zagreb Univ., Yugoslavia). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33842 (INIS-mf—10904, pp 465) **Combined modality treatment in head and neck cancer.** Nagykalnai, T.; Nemeth, Gy. (Weil Emil Korhaz-Rendeloeintezet, Budapest, Hungary). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33843 (INIS-mf—10904, pp 467) **Combination radiotherapy and chemotherapy (FAM) in advanced rectum and sigmoid colon adenocarcinoma. A 5-year follow-up.** Comella, G.; Scoppa, G.; Scarpa, A.; Ianniello, G.; Comella, P.; Anania, C.; Zarrilli, D. (Tumour Institute, Naples, Italy). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33844 (INIS-mf—10904, pp 467) **Preoperative versus postoperative radiotherapy in the treatment of rectal cancer.** Cerra, R.; Parisi, V.; Mastro, A.A.; Scoppa, G.; Anania, M.C.; Malgieri, F.; Cremona, F.; Nistico, P.; Lo Passo, L.; Iodice, F. (Istituto Nazionale Tumori 'Fondazione G. Pascale', Naples, Italy). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33845 (INIS-mf—10904, pp 467) **Effect of the preoperative radiation in the combination treatment of rectum cancer.** Keakot, V.A.; Tophan, A.V.; Chernichenko, V.A. (Nauchno-Issledovatel'skij Rentgeno-Radiologicheskij i Onkologicheskij Institute, Kiev, Ukrainian SSR). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33846 (INIS-mf—10904, pp 467) **Role of radiation therapy in the integrated treatment policy of patients with upper gastrointestinal carcinoma.** Karim, A.B.M.F.; Kralendonk, J.H.; Njo, K.H. (Vrije Univ., Amsterdam, Netherlands). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33847 (INIS-mf—10904, pp 468) **Hepatic irradiation in primary and metastatic liver cancer.** Hatano, K.; Mikuriya, S. (Haibara General Hospital, Shizuoka, Japan; National Medical Center of Hospital, Tokyo, Japan). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33848 (INIS-mf—10904, pp 468) **High dose internal radiotherapy of bile duct carcinoma.** Keleti, Gy.; Barda, L.; Zarand, P.; Polgar, I.; Nemeth, Gy. (Foevarosi Laszlo Korhaz, Budapest, Hungary; Weil Emil Korhaz-Rendeloeintezet, Budapest, Hungary). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33849 (INIS-mf—10904, pp 468) **Results of radiotherapy of oesophageal cancer.** Morysinski, T.; Danczak-Ginalska, Z. (Instytut Onkologii, Warsaw, Poland). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33850 (INIS-mf—10904, pp 468) **Treatment of cancer of the esophagus by intracavitary and external irradiation.** Flores, A.D. (Cancer Control Agency of British Columbia, Vancouver). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33851 (INIS-mf—10904, pp 469) **Radiation therapy of nonoperable esophagus cancer by fractional therapy.** Abdrahmanov, J.N.; Balmukhanov, S.B.; Revesz, L. (Kazakhskij Nauchno-Issledovatel'skij Institute Onkologii i Radiologii, Alma-Ata, USSR; Karolinska Institute, Stockholm, Sweden). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33852 (INIS-mf—10904, pp 469) **Role of radiotherapy in primary gastrointestinal lymphoma: primary or adjuvant.** Ampil, F.; Datta, R.; Datta, S.; Bahrassa, F. (Louisiana State Univ., Shreveport). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33853 (INIS-mf—10904, pp 469) **Combined effects of radiation and regional chemotherapy.** Bilenjki, D.; Dordevic, J.; Lincender, L.; Radovic, F. (Institute of Radiology and Oncology, Sarajevo, Yugoslavia). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33854 (INIS-mf—10904, pp 217) **Boron neutron capture therapy.** Al-Samarrai, S.F.; Hatanaka, H. (Baghdad Univ., Iraq; Teikyo Univ., Tokyo, Japan). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33855 (INIS-mf—10904, pp 217) **Chemoradiotherapy of cancer: incorporation of boron into monoclonal antibodies and promazines for neutron capture therapy.** Soloway, A.H.; Alam, F.; Barth, R.F.; Adams, D.; Carey, W.E. (Ohio State Univ., Columbus). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33856 (INIS-mf—10904, pp 218) **Treatment of painful bone metastases by systemic (^{89}Sr) administration.** Lahneche, B.E.; Santt, F.; Chauvot, P.; Bouvier, J.F.; Lacroze, M.; Papillon, J. (Centre Leon Berard, Lyon, France). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33857 (INIS-mf—10904, pp 218) **Results of ^{89}strontium therapy in patients with incurable pain from bone metastases.** Benulic, T.; Guna, F.; Marolt, F.; Fabjancic, G. (Intitute of Oncology, Ljubljana, Yugoslavia). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33858 **(INIS-mf—10909) XXIVth days of nuclear medicine. Abstracts of papers.** (Ceskoslovenska Spolecnost Nuklearni Mediciny a Radiacni Hygieny). 1 Sep 1986. 80p. (In Czech and Slovak). (CONF-8510441—Absts.). NTIS (US Sales Only), PC A05/MF A01. File Number DE87702301.

From 24. days of nuclear medicine; Opava, Czechoslovakia (9 Oct 1985).

Abstracts are presented of papers submitted to the 24th Days of Nuclear Medicine held in Opava, Czechoslovakia between October 9 and 11, 1985. The conference proceeded in three sessions, namely nuclear pediatrics, miscellaneous and technicians' session. The publication also contains abstracts of posters.

33859 **(LBL—21800) On the convergence of the maximum likelihood estimator method of tomographic image reconstruction.** Llacer, J.; Veklerov, E.; Hoffman, E.J. (Lawrence Berkeley Lab., CA (USA); California Univ., Los Angeles (USA). Dept. of Radiological Sciences). Jun 1986. Contract AC03-76SF00098. 10p. (CONF-870269—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87006935.

From Society of Photo-Optical Instrumentation Engineers' medical imaging I conference; Newport Beach, CA, USA (1 Feb 1987).

The Maximum Likelihood Estimator (MLE) method of image reconstruction has been reported to exhibit image deterioration in regions of expected uniform activity as the number of iterations increases beyond a certain point. This apparent instability raises questions as to the usefulness of a method that yields images at different stages of the reconstruction that could have different medical interpretations. In this paper we look in some detail into the question of convergence of MLE solutions at a large number of iterations and show that the MLE method converges towards the image that it was designed to yield, i.e., the image which has the maximum likelihood to have generated the specific projection data resulting from a measurement. We also show that the maximum likelihood image can be a very deteriorated version of the true source image and that only as the number of counts in the projection data becomes very high, will the maximum likelihood image converge towards an acceptable reconstruction.

33860 **(LBL—21874) The high sensitivity of the maximum likelihood estimator method of tomographic image reconstruction.** Llacer, J.; Veklerov, E. (Lawrence Berkeley Lab., CA (USA)). Jan 1987. Contract AC03-76SF00098. 9p. (CONF-870750—1). NTIS MF A01; 2; GPO Dep. File Number DE87007612.

From CAR '87: international symposium on Computer Assisted Radiology; Berlin, F.R. Germany (1 Jul 1987).

Positron Emission Tomography (PET) images obtained by the MLE iterative method of image reconstruction converge towards strongly deteriorated versions of the original source image. The image deterioration is caused by an excessive attempt by the algorithm to match the projection data with high counts. We can modulate this effect. We compared a source image with reconstructions by filtered backprojection to the MLE algorithm to show that the MLE images can have similar noise to the filtered backprojection images at regions of high activity and very low noise, comparable to the source image, in regions of low activity, if the iterative procedure is stopped at an appropriate point.

33861 **(LBL—22962) Proceedings of the fifth PTCOG meeting and international workshop on biomedical accelerators.** (Lawrence Berkeley Lab., CA (USA)). Apr 1987. Contract AC03-76SF00098. 237p. (CONF-861271—). NTIS, PC A11/MF A01; 1; GPO Dep. File Number DE87009281.

From 5. Particle Therapy Cooperative Group (PTCOG) meeting and international workshop on biomedical accelerators; Berkeley, CA, USA (1 Dec 1986).

This volume contains the proceeding and individual papers presented at the Fifth PTCOG meeting and International Workshop on Biomedical Accelerators. The meeting was divided into sessions on the biomedical aspects of therapy delivery, new biomedical accelerators, facilities, and beam localization and status report. Individual papers have been abstracted and indexed for the Energy Data Base.

33862 **Lipid polymorphism of mixtures of dioleoylphosphatidylethanolamine and saturated and monounsaturated phosphatidylcholines of various chain lengths.** Tate, M.W.; Gruner, S.M. (Princeton Univ., NJ). *Biochemistry;* **26**: No. 1, 231-236(13 Jan 1987). Contract AC02-76EV03120.

The L/sub α/-H/sub II/ phase transition behavior of many lipid-water liquid crystals is dominated by the competition between the tendency to curl the lipid layers to an intrinsic radius of curvature and opposing hydrocarbon packing constraints. In particular, packing constraints can increase the free energy of the inverted hexagonal (H/sub II/) phase as compared to that of the lamellar (L/sub α/) phase. This is especially true where the lipid molecule is not long enough to reach into the corners of the lattice in large hexagonal structures necessitated by a large radius of curvature.In this paper it is shown that the addition of a minor fraction long-chain lipid to a system of otherwise uniform chain composition can also relax packing constraints, thereby lowering the lamellar to hexagonal transition temperature. For the specific systems used, dioleoylphosphatidylethanolamine (di-18:1/sub c/-PE) with minor fractions of 1,2-diacyl-sn-glycero-3-phosphocholines [di-n:1/sub c/-PC (n = 14, 18, 22, and 24)], the observed H/sub II/lattices systematically increased in size with increasing chain length suggesting that the chain length also may affect the intrinsic curvature of the mixture. These experiments demonstrate that the lipid shape concept, which is a qualitative expression of the concept quantitatively described by the intrinsic radius of curvature, is insufficient to understand the L/sub α/-H/sub II/ transition. It is necessary to, at least, consider the competition between curvature and packing.

33863 **Design and construction of equipment for point-source, low energy electron microdosimetry measurements.** Zanelli, C.I.; Jungerman, J.A.; Goodart, C.D.; Lagunas-Solar, M.C.; De Nardo, G.L.; De Nardo, S.J. (Univ. of California, Davis, CA). *Journal of Nuclear Medicine;* **25**: No. 5, 40(1984). (CONF-840619—).

From 31. annual meeting of the Society of Nuclear Medicine; Los Angeles, CA, USA (5 Jun 1984).

Actual measurements of dose as a function of distance for point-source, discrete energy spectra are essential to the selection of radionuclides for radioimmunotherapy, as the present theoretical basis provides extrapolations into the low energy region where assumptions about the energy-loss mechanisms are believed to break down. The authors present a discussion of design criteria for an apparatus aimed at measuring dose in gases for low energy (10 to 100 keV) electron sources, as well as description of the equipment that emerged from this analysis. Given the short ranges involved, an almost-wall-less ionization chamber with cylindrical symmetry was selected. The chamber is fixed in position and a radioactive point-source is moved along its axis by remote control, preventing air disturbances in the chamber while obtaining ionization current measurements. A laser-aided positioning mechanism maintains alignment of the axis within 0.5 mm, and chamber-to-source distance is known within 0.3 mm. Special attention was given to the open-air ionization chamber design, and two different models were built. Guarding, grounding, and insulating schemes are proposed. The apparatus

can be easily modified for use with gases other than air. This equipment is presently being used to provide data for validation of, or corrections to, available theoretical calculations.

5507 Microbiology

REFER ALSO TO CITATION(S) 33749, 33767, 33893

5509 Pathology

33864 (DOE/BP—808) Review of current literature and research on gas supersaturation and gas bubble trauma: Special publication Number 1. Colt, J.; Bouck, G.; Fidler, L. (Fish Factory, Davis, CA (USA); Bonneville Power Administration, Portland, OR (USA); British Columbia Univ., Vancouver (Canada). Dept. of Zoology). Mar 1987. 53p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87009906.

This report presents recently published information and ongoing research on the various areas of gas supersaturation. Growing interest in the effects of chronic gas supersaturation on aquatic animals has been due primarily to heavy mortality of salmonid species under hatchery conditions. Extensive examination of affected animals has failed to consistently identify pathogenic organisms. Water quality sampling has shown that chronic levels of gas supersaturation are commonly present during a significant period of the year. Small marine fish larvae are significantly more sensitive to gas supersaturation than salmonids. Present water quality criteria for gas supersaturation are not adequate for the protection of either salmonids under chronic exposure or marine fish larvae, especially in aquaria or hatcheries. To increase communication between interested parties in the field of gas supersaturation research and control, addresses and telephone numbers of all people responding to the questionnaire are included. 102 refs.

33865 (DOE/BP/11987—2) Epidemiology and control of infectious diseases of salmonids in the Columbia River Basin: Annual report, FY 1986. Fryer, J.L. (Oregon State Univ., Corvallis (USA). Dept. of Microbiology). Dec 1986. Contract AI79-83BP11987. 44p. NTIS, PC A03/MF A01; GPO Dep. File Number DE87009918.

Ceratomyxosis caused by the myxosporidan parasite Ceratomyxa shasta, bacterial kidney disease, the causative agent Renibacterium salmoninarum, and infectious hematopoietic necrosis, caused by a rhabdovirus are all highly destructive and difficult or impossible to treat with antimicrobial agents. The geographic range of the infectious stage of C. shasta has been extended to include the Snake River to the Oxbow and Hells Canyon Dams. These are the farthest upriver sites tested. Infections of ceratomyxosis were also initiated in the east fork of the Lewis River and in the Washougal River in Washington. Laboratory studies with this parasite failed to indicate that tubeficids are required in its life cycle. Bacterial kidney disease has been demonstrated in all life stages of salmonids: in the eggs, fry, smolts, juveniles and adults in the ocean, and in fish returning to fresh water. Monoclonal antibodies produced against R. salmoninarum demonstrated antigenic differences among isolates of the bacterium. Monoclonal antibodies also showed antigens of R. salmoninarum which are similar to those of a wide variety of gram positive and gram negative bacteria. A demonstration project at Round Rutte Hatchery showed uv treatment to be an effective method for reducing the microbial population of the water supply and could reduce risks of IHNV. Tagential flow filtration was used successfully to concentrate IHNV from environmental water. At Round Butte Hatchery the carrier rate of IHNV in adults was very low and there was no subsequent mortality resulting from IHN in juveniles.

33866 (PB—87-166948/XAB) (32)P-adduct assay: principle and applications to carcinogen-exposed animal and human DNA. Gupta, R.C.; Sharma, S.; Earley, K.; Mohapatra, N.; Nesnow, S. (Baylor Univ., Houston, TX (USA). Coll. of Medicine). Mar 1987. 18p. NTIS, PC A02/MF A01.

There is growing evidence that carcinogens initiate the malignant process via specific alterations in DNA structure, i.e., the covalent binding of carcinogens to DNA bases. Thus, carcinogen-DNA adducts represent as markers for tumor initiation. Several new techniques have been reported for detecting exceptionally small quantities of adducts without requiring test chemicals to be radioactive. These methods are based on specific antibodies, fluorescence spectra, electrophore labeling, and 32P incorporation into DNA constituents. Recent developments have indicated that the (32)P labeling method is capable of measuring a wide spectra of unusually low levels .10 to the tenth power nucleotides of DNA adducts induced by a vast majority of known aromatic/hydrophobic environmental carcinogens (Gupta, 1985). The paper reviews the underlying principle of the approach, as well as some recent applications.

5510 Physiological Systems

REFER ALSO TO CITATION(S) 33766

33867 Origin of growth-induced water potential. Nonami, H.; Boyer, J.S. (Texas A and M Univ., College Station). *Plant Physiology;* **83**: No. 3, 596-601(Mar 1987). Contract FG05-84ER13273.

The authors developed a new method to measure the solute concentration in the apoplast of stem tissue involving pressurizing the roots of intact seedlings (Glycine max [L.] Merr. or Pisum sativum L.), collecting a small amount of exudate from the surface of the stem under saturating humidities, and determining the osmotic potential of the solution with a micro-osmometer capable of measuring small volumes (0.5 microliter). In the elongating region, the apoplast concentrations were very low (equivalent to osmotic potentials of -0.03 to -0.04 megapascal) and negligible compared to the water potential of the apoplast (-0.15 to -0.30 megapascal) measured directly by isopiestic psychrometry in intact plants. Most of the apoplast water potential consisted of a negative pressure that could be measured with a pressure chamber (-0.15 to -0.28 megapascal). Tests showed that earlier methods involving infiltration of intercellular spaces or pressurizing cut segments caused solute to be released to the apoplast and resulted in spuriously high concentrations. These results indicate that, although a small amount of solute is present in the apoplast, the major component is a tension that is part of a growth-induced gradient in water potential in the enlarging tissue. The gradient originates from the extension of the cell walls, which prevents turgor from reaching its maximum and creates a growth-induced water potential that causes water to move from the xylem at a rate that satisfies the rate of enlargement. The magnitude of the gradient implies that growing tissue contains a large resistance to water movement.

33868 Pressure probe and isopiestic psychrometer measure similar turgor. Nonami, H.; Boyer, J.S.; Steudle, E. (Univ. of Illinois, Urbana). *Plant Physiology;* **83**: No. 3, 592-595(Mar 1987). Contract FG05-84ER13273.

Turgor measured with a miniature pressure probe was compared to that measured with an isopiestic thermocouple psychrometer in mature regions of soybean (Glycine max [L.] Merr.) stems. The probe measured turgor directly in cells of intact stems whereas the psychrometer measured the water potential and osmotic potential of excised stem segments and turgor was calculated by difference. When care was taken to prevent dehydration when working with the pressure probe, and diffusive resistance and dilution errors with the psychrometer, both methods gave similar values of turgor whether the plants were dehydrating or rehydrating. This finding, together with the previously demonstrated similarity in turgor measured with the isopiestic psychrometer and a pressure chamber, indicates that the pressure probe provides accurate measurements of turgor despite the need to penetrate the cell. On the other hand, it suggest that as long as precautions are taken to obtain accurate values for the water potential and osmotic potential, turgor can be determined by isopiestic psychrometry in tissues not accessible to the pressure probe for physical reasons.

33869 The test-retest PETT experiment paradigm: The subject as his own reference. Russell, J.A.G.; Wolf, A.P. (Brookhaven National Lab., Upton, NY). *Journal of Nuclear Medicine;* **25**: No. 5, 33(1984). (CONF-840619—).

From 31. annual meeting of the Society of Nuclear Medicine; Los Angeles, CA, USA (5 Jun 1984).

Using the radiotracer carbon-11 deoxyglucose, and the PETT the authors measured the regional glucose metabolic rates in the brains of 20 normal resting male subjects twice within an interval of less than 3 hours. For each of 12 cerebral regions the mean percentage change in metabolic rate between the two measurements were computed for the group. The measurement errors were propagated through all of the calculations from the PETT data acquisition to the mean of the ratios. Typical group mean changes for regions usually involved in cognitive activities were 6% (SD 3%) and for the cerebellum and thalamus 2% (SD 1%). To test the sensitivity of the paradigm the authors compared the regional changes between a resting condition and a hand-clasping task in 5 normal subjects and found typical task-related increases of 14% (SD 5%) in regions associated with volitive motor activity. When compared statistically to the changes measured in the resting group, the task-related changes were significant at the 5% level or smaller in 10 of the 12 regions. The authors describe the Test-Retest methodology, the quantitative image comparison techniques, and the propagation of errors through the entire PETT method to yield a quantitative intervention-related effect measure.

5520 Public Health

REFER ALSO TO CITATION(S) 33024, 33025

5530 Agriculture And Food Technology

REFER ALSO TO CITATION(S) 32624, 33527, 33528, 33767, 33864

33870 (CONF-8510249—Vol.2, pp 711-720) **Integration of Landsat digital data with agricultural information - an operational approach to crop prediction models.** Wolfaardt, P.J. (Rand Afrikaans Univ., South Africa). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

This paper describes a study of which the main aim is the integration of Landsat MSS data with agricultural statistics to analyze, explain and forecast the spatial variation of crop production in a specific area by means of an operational crop prediction model. Two analytical phases were executed: the interpretation of the data base (agricultural and Landsat data) and, the integration phase (land-use information derived from Landsat integrated with relevant agricultural statistics). This research employed two integration models: (a) an empirical model which also served as the structural basis of, (b) an operational model. According to the overall results obtained with this approach to crop forecasting, the operational model holds great potential and is ideally suitable for smaller, homogeneous areas. 9 references, 12 figures, 1 table.

33871 (CONF-8510249—Vol.2, pp 721-726) **Investigation of strategies for estimation of crop yield using multi-source data.** Nessa, M.; Colwell, J.E.; Aggarwala, R.K. (Space Research and Remote Sensing Organization, Dhaka, Bangladesh). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

The purpose of this investigation was to examine some possible approaches for estimating crop yield by suitable combinations of field data, remote sensing data, and meteorological data. The two approaches discussed in this paper are: (1) estimation using a combination of field data and remote sensing data; and (2) estimation using a combination of meteorological data and remote sensing data. The results of this investigation suggest that suitable combinations of field, meteorological, and remote sensing data can improve crop yield estimates compared to any single source of data. 3 references, 3 tables.

33872 (CONF-8510249—Vol.2, pp 839-846) **Correlation analysis between spectral reflectance data and wheat yield in Argentina.** Serafini, M.C. (CNIE, Argentina). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

Remotely sensed data provide an evaluation means of crop condition and can give information about final yields. The main objective of this study is to analyze the existent relationship between Landsat spectral values and winter wheat yields in the Partido of Trenque Lauquen (Buenos Aires, Argentina). Ground truth data about planting dates and final yields were collected over wheat fields during 1980/81, 1981/82 and 1982/83 growing seasons. Landsat acquisitions during the wheat flowering period were gathered for the study. Four band mean values were obtained for each field and MSS7/MSS5 band ratio and TVI7, and GVI vegetation indices models were calculated. The regression analysis using Landsat spectral values, ratios and vegetation indices yielded a significant correlation with wheat final yield using these field samples. 10 references, 4 figures.

33873 **(DOE/BP—816) Papers on the use of supplemental oxygen to increase hatchery rearing capacity in the Pacific Northwest.** (USDOE Bonneville Power Administration, Portland, OR. Div. of Fish and Wildlife). Apr 1987. 53p. (CONF-861280—Exc.). NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87009907.

From Pacific northwest fish culture conference; Springfield, OR, USA (2 Dec 1986).

The report contains papers on the following topics: (1) water quality management in intensive aquaculture; (2) Michigan's use of supplemental oxygen; (3) engineering considerations in supplemental oxygen; (4) use of oxygen to commercially rear coho salmon; (5) use of oxygen to commercially rear spring chinook salmon; and (6) interaction of oxygen and rearing density on adult returns. (ACR)

33874 **(DOE/BP/16440—2) Freeze brand marking of steelhead trout and chinook salmon from Idaho for the 1986 Smolt Monitoring Program: 1986 annual report.** Norton, J.A. (Idaho Dept. of Fish and Game, Boise (USA)). Oct 1986. Contract AI79-84BP16440. 9p. NTIS, PC A02/MF A01; GPO Dep. File Number DE87009915.

Between the fall of 1985 and spring of 1986, 403,260 chinook salmon (Oncorhynchus tshawytscha) and steelhead trout (Salmo gairdneri) juveniles were freeze branded for the National Marine Fisheries Service Downstream Smolt Monitoring Program in association with the Fish Passage Center. After brand loss and mortality, branded fish releases were: 160,100 spring chinook salmon, 43,325 summer chinook salmon, 102,100 A-run steelhead trout, and 86,350 B-run steelhead trout. Freeze brand group releases began March 24 and were completed by May 7, 1986.

33875 **(IAEA-TECDOC—405) Radiotracer studies of pesticide residues in stored products. Report of a research co-ordination meeting on isotopic tracer-aided studies of pesticide residues in stored products held at London, Ontario, Canada, 5-9 May 1986.** (Joint FAO/IAEA Div. of Isotope and Radiation Applications of Atomic Energy for Food and Agricultural Development, Vienna (Austria)). Jan 1987. 108p. (CONF-8605257—). NTIS (US Sales Only), PC A06/MF A01. File Number DE87702285.

From Research co-ordination meeting on isotopic tracer-aided studies of pesticide residues in stored products; London, Canada (5 May 1986).

The current program was initiated in 1983 and was designed to assist scientists of developing Member States to make safe and effective use of radiotracer techniques for studying pesticide residue problems in stored products. This report represents an appraisal of a group of studies with particular emphasis given to terminal residues at the time of human consumption. A separate abstract was prepared for each of the 12 papers.

33876 (IAEA-TECDOC—405, pp 7-14) **Fate and magnitude of malathion residues in stored wheat and barley.** Gozek, K.; Artiran, F. (Ankara Nuclear Research and Training Center, Turkey). Jan 1987. NTIS (US Sales Only), PC A06/MF A01. File Number DE87702285. (CONF-8605257—).

From Research co-ordination meeting on isotopic tracer-aided studies of pesticide residues in stored products; London, Canada (5 May 1986).

Wheat and barley, treated with ^{14}C-malathion, were stored in two different types of Middle Anatolian conditions for 9 months. The surface, extractable and bound residues and the effect of baking were investigated. Surface and extractable ^{14}C-malathion residues were affected by storage time, but not by the type of storage. There is no significant difference between residues in grains stored in wooden boxes and those stored in enamel-ware buckets. Results show that surface and extractable residues increase with storage time. Bound residues were negligible. The maximum value of malathion residues in the grain was 6.5 mg/kg. 3 references, 5 tables.

33877 (IAEA-TECDOC—405, pp 15-19) **Isotopic tracer-aided studies of malathion residues in stored winter wheat.** Vojinovic, V.; Neskovic, N. (INEP, Institute of Pesticides and Environmental Protection, Belgrade, Yugoslavia). Jan 1987. NTIS (US Sales Only), PC A06/MF A01. File Number DE87702285. (CONF-8605257—).

From Research co-ordination meeting on isotopic tracer-aided studies of pesticide residues in stored products; London, Canada (5 May 1986).

The study covered the level of contamination of wheat stored for a period of 9 months in a wooden container previously treated with malathion. Winter wheat (Triticum vulgare sv. Novosadska rana 1) was treated with ^{14}C-labelled malathion and the degree of contamination was found to differ, depending on the time of storage. From the moment of storage in the container the contamination increased up to 3 months, and then it remained at almost the same level, for the next 6 months. Regarding the distribution of the residues, i.e. the ratio of surface/methanol extractable residues, 20 times more malathion was found on the surface than in the grain during the first three months, while from 3 to 9 months the amount of residues in the grain increased so that the difference in favor of surface residues was only 4-5 times. Total surface and extractable residues were 2.6 mg/kg grain after 9 months. 5 references, 1 table.

33878 (IAEA-TECDOC—405, pp 21-28) **Persistence of malathion residues in stored milled rice.** Juzu, H.A. (Agricultural Univ. of Malaysia, Serdang, Selangor). Jan 1987. NTIS (US Sales Only), PC A06/MF A01. File Number DE87702285. (CONF-8605257—).

From Research co-ordination meeting on isotopic tracer-aided studies of pesticide residues in stored products; London, Canada (5 May 1986).

Residues of ^{14}C-malathion in stored milled rice were studied for 39 weeks under conditions simulating local practice. Residues from single and multiple applications were examined. For the single application total, surface, extractable and bound residues in the rice grains were determined. Only the total residues were determined after multiple applications. For the single application, 6-7% of the applied amount was found in the grains 24 weeks after treatment. After 9-11 months storage, about 10% of the total quantity of the applied malathion remained on the surface of the jute sack and about 5% was present in the grains. Data showed also that 50-60% of the total residues in the grains were present as surface residues. Washing the rice thoroughly before cooking removed the surface residues. During cooking, 57% of the extractable residues was lost. 3 references, 3 tables.

33879 (IAEA-TECDOC—405, pp 29-42) **Comparison of a laboratory scale experiment with a field trial treatment using chlorpyrifos-methyl.** Matthews, W.A. (Ministry of Agriculture, Fisheries and Food, Slough, England). Jan 1987. NTIS (US Sales Only), PC A06/MF A01. File Number DE87702285. (CONF-8605257—).

From Research co-ordination meeting on isotopic tracer-aided studies of pesticide residues in stored products; London, Canada (5 May 1986).

An experiment was carried out in which a field treatment of a small bulk of grain with chlorpyrifos-methyl was compared with a laboratory treatment of 1 kg of grain with ^{14}C radiolabelled chlorpyrifos-methyl. The conditions under which the grain was maintained in the laboratory mimicked those of the field trial as closely as possible, with sampling and analysis being carried out at the same time and in a similar manner in both. The results from the two experiments were in general agreement with approx. 60% of the chlorpyrifos-methyl remaining intact at the end. A satisfactory level of biological control was achieved in the field trial. The use of the radio-label enabled more information about the fate of the degraded insecticide to be obtained from the laboratory experiment. The majority of this radioactivity comprised a fraction which remained within the grain tissue after solvent extraction. The level of activity in the grain tissues gradually increased with time but its nature is as yet unknown. The good agreement obtained between the residue profile and the breakdown patterns in both experiments would suggest that a laboratory scale experiment is a satisfactory model for the situation pertaining in a large scale field trial. 14 references, 5 figures.

33880 (IAEA-TECDOC—405, pp 43-48) **Residues of ^{14}C-pirimiphos-methyl in stored potatoes.** Hadjidemetriou, D.G. (Agricultural Research Institute, Nicosia, Cyprus). Jan 1987. NTIS (US Sales Only), PC A06/MF A01. File Number DE87702285. (CONF-8605257—).

From Research co-ordination meeting on isotopic tracer-aided studies of pesticide residues in stored products; London, Canada (5 May 1986).

Potato tubers stored at room temperature were treated with pirimiphos-methyl containing radiolabelled material at the rate of 5 mg of active ingredient per kilogram. Residues were almost totally found on the skin. After storage for 16 weeks, terminal residues were 0.55 and 0.004 mg/kg for skin and flesh respectively. These residues amounted to about 10% of the applied chemical. The apparent half-life value of residues on the skin was 47 days and for the flesh 64 days. 7 references, 2 figures, 1 table.

33881 (IAEA-TECDOC—405, pp 49-55) **Stability of tetrachlorvinphos residues in faba beans and soya bean oil towards different processing procedures.** Zayed, S.M.A.D.; Farghaly, M. (Middle Eastern Regional Radioisotope Centre for the Arab Countries, Cairo, Egypt; National Research Centre, Cairo, Egypt). Jan 1987. NTIS (US Sales Only), PC A06/MF A01. File Number DE87702285. (CONF-8605257—).

From Research co-ordination meeting on isotopic tracer-aided studies of pesticide residues in stored products; London, Canada (5 May 1986).

Cooking of contaminated faba beans did not degrade the originally present potentially toxic residues, namely, tetrachlorvinphos and its desmethyl derivative to any appreciable extent. Processing of contaminated soya bean oil, on the other hand, led to degradation of tetrachlorvinphos and its metabolites to give mono and dimethyl phosphates. Feeding of mice with bound residues of tetrachlorvinphos in beans for 90 days led to an apparent decrease in the rate of body weight gain. 5 references, 4 tables.

33882 (IAEA-TECDOC—405, pp 57-63) **^{14}C-lindane residues in stored maize grain in Brazil.** Pedral Sampaio, M.R.F.; Bitran, E.A.; Ruegg, E.F.; Abussamra, M. (Biological Institute Radioisotope Center, Sao Paulo, Brazil). Jan 1987. NTIS (US Sales Only), PC A06/MF A01. File Number DE87702285. (CONF-8605257—).

From Research co-ordination meeting on isotopic tracer-aided studies of pesticide residues in stored products; London, Canada (5 May 1986).

The distribution and fate of the insecticide ^{14}C-lindane in stored maize grains were studied for 36 weeks in the laboratory under conditions simulating local agricultural practices. Surface extracts declined from 10.9% of the applied activity at zero time (0-24 hours) to 1.5% after 36 weeks. Lindane penetrated the seed coat and internal (methanol-extractable) residues accounted for 38% of the applied activity, after 4 weeks. Bound pesticide residues reached a maximum of 23.4% after the second week and declined very slowly to 10.7% after 36 weeks. A total concentration of lindane residues in the grain (methanol-extractable and bound) was calculated to be 7.6 mg/kg at the end of the storage period. 4 references, 1 table.

33883 (IAEA-TECDOC—405, pp 65-70) **Determination of ^{14}C-lindane residues in stored rice.** Borrero de Saiz, E.; Ramon, F.; Ferrer, H.; Espinosa, J. (Universidad de Panama, Panama City). Jan 1987. NTIS (US Sales Only), PC A06/MF A01. File Number DE87702285. (CONF-8605257—).

From Research co-ordination meeting on isotopic tracer-aided studies of pesticide residues in stored products; London, Canada (5 May 1986).

^{14}C-lindane was applied as dust to paddy rice. Surface, extractable and bound residues were determined in paddy rice up to a storage period of nine months. The surface and methanol-extractable residues decreased with storage time. The husk contained a greater amount of lindane compared to the grains. After removing surface residues, the grain was found to contain 2.7 mg/kg of extractable lindane and/or equivalent residues after nine months from treatment. 2 references, 2 tables.

33884 (IAEA-TECDOC—405, pp 71-73) **Residues of ^{14}C-lindane in stored faba beans.** Zayed, S.M.A.D.; Farghaly, M. (Middle Eastern Regional Radioisotope Centre for the Arab Countries, Cairo, Egypt; National Research Centre, Cairo, Egypt). Jan 1987. NTIS (US Sales Only), PC A06/MF A01. File Number DE87702285. (CONF-8605257—).

From Research co-ordination meeting on isotopic tracer-aided studies of pesticide residues in stored products; London, Canada (5 May 1986).

Over 70% of the applied ^{14}C-lindane penetrated into stored faba beans during 30 weeks. The percentage of bound residues in the grains did not exceed 3%. Feeding of the bound residues to mice considerably reduced body weight gain. 4 references, 2 tables.

33885 (IAEA-TECDOC—405, pp 75-80) **Isotopic tracer-aided studies of fenvalerate residues in stored rice grains.** Varca, L.M.; Sanchez, T.E.; Magallona, E.D. (University of the Philippines, Los Banos). Jan 1987. NTIS (US Sales Only), PC A06/MF A01. File Number DE87702285. (CONF-8605257—).

From Research co-ordination meeting on isotopic tracer-aided studies of pesticide residues in stored products; London, Canada (5 May 1986).

Fenvalerate was applied to milled rice and paddy prior to storage at a concentration of 0.4 mg/kg. Surface, methanol-extractable and bound residues were determined in milled rice, brown rice and rice husk up to a storage period of nine months. Surface residues of both milled and paddy rice decreased with time of storage. The extractable residues likewise decreased with storage time. Paddy rice contained less extractable residue than milled rice, with the major part found in the husk. After two months, one third of the applied dose was present in milled rice while it took six to nine months for paddy rice to reduce its residue to one third of the original dose. Bound residues in both milled and paddy rice decreased also with length of storage, and accounted for 75 and 40% of the total residue respectively after 6 months. Cooking reduced the insecticide residues in milled rice by 33-40% and 58% in paddy rice. 4 references, 1 figure, 3 tables.

33886 (IAEA-TECDOC—405, pp 81-88) **Ethylene dibromide residue studies in stored maize grain.** Takyi, E.E.K. (Ghana Atomic Energy Commission, Accra). Jan 1987. NTIS (US Sales Only), PC A06/MF A01. File Number DE87702285. (CONF-8605257—).

From Research co-ordination meeting on isotopic tracer-aided studies of pesticide residues in stored products; London, Canada (5 May 1986).

Maize grains were fumigated with ^{14}C-ethylene dibromide according to fumigation practices in Ghana. ^{14}C-residues declined to 12 mg/kg after 40 weeks, of which 5 mg/kg was methanol-extractable, the remaining being bound. The importance of proper airing after fumigation has been clearly demonstrated. 7 references, 1 figure, 2 tables.

33887 (IAEA-TECDOC—405, pp 89-95) **Residues resulting from fumigation of food commodities with methyl bromide.** Bond, E.J.; Starratt, A.N. (Agriculture Canada, London, Ontario). Jan 1987. NTIS (US Sales Only), PC A06/MF A01. File Number DE87702285. (CONF-8605257—).

From Research co-ordination meeting on isotopic tracer-aided studies of pesticide residues in stored products; London, Canada (5 May 1986).

An investigation was undertaken to determine the nature and significance of residues remaining in methyl bromide-fumigated commodities using radiotracer techniques (^{14}C-methyl bromide). Experiments with corn showed that the germ part of the kernel contained nearly half of the total ^{14}C-residue remaining in the seed. Also preliminary tests with granny smith apples revealed that considerable residue may remain in seeds of treated apples with less in skin and the least in the fleshy pulp. In fumigated corn, fractionation revealed that radioactive residues were distributed throughout albumins, globulins, Zein 1, Zein 2 and glutelin with a large part in the aqueous extract (amino acids). Further investigation emphasized the characterization of volatile substances resulting from alkali treatment. It was found that methyl bromide readily methylated methionine and this constitutes a major site of methylation. A component of the volatile fraction was dimethyl sulfoxide, probably a product of oxidation of dimethyl sulfide. Work is in progress to determine whether methyl bromide will methylate purine and pyrimidine components. 4 references, 3 tables.

33888 (INIS-mf—10889, pp 15) **Preservation of strawberries and mushrooms with 10 MeV electron beam.** Bryl-Sandelewska, T.; Rochalska, M.; Zimek, Z.; Milner, E.; Panta, P.; Stachowicz, W. (institute of Nuclear Chemistry and Technology, Warsaw, Poland). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33889 (INIS-mf—10889, pp 53) **Food irradiation in Belgium. The plants of the Institut National des Radioelements.** Lacroix, J.P. (Institut National des Radioelements, Brussels, Belgium). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33890 (INIS-mf—10889, pp 75) **Some experience with the irradiation of wheat flour.** Sedlackova, J.; Zuska, J.; Pernicova, M.; Kosarova, J. (Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia; Vyzkumny Ustav Potravinarskeho Prumyslu, Prague, Czechoslovakia; Vysoka Skola Chemicko-Technologicka, Prague, Czechoslovakia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33891 (INIS-mf—10889, pp 76) **US development in food irradiation and the use of cesium irradiators.** Sivinski, J.S. (New Mexico Univ., Albuquerque). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33892 **(Juel—2067) Comparative investigations on the transferability of results from standardized vessel and lysimeter experiments on the actual field conditions with the example of the residue situation in plants after spraying with Goltix and Tribunil.** Hansper, M. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Radioagronomie; Bonn Univ. (Germany, F.R.)). Jun 1986. 219p. (In German). NTIS (US Sales Only), PC A10/MF A01. File Number DE87751907.

The radioactivity values in the plant samples of the lysimeter and vessel experiments made it possible to calculate the material equivalent quantities in mg/kg of fresh or dry mass. The basis for the calculation was the specific /sup 14/C activity of the applied materials. In these calculated material equivalent quantities one is dealing with compounds, which originate from a large number of material change processes including reassimilated in /sup 14/CO/ sub 2/ from decomposition processes in the ground. Within one test unit, with one exception, double quantities always led to residues of more than twice as much in the plants.

33893 **Virulence of Agrobacterium tumefaciens strain A281 on legumes.** Hood, E.E.; Fraley, R.T.; Chilton, M.D. (Washington Univ., St. Louis, MO). *Plant Physiology;* **83**: No. 3, 529-534(Mar 1987). Contract AC02-81ER10888.

This study addresses the basis of host range on legumes of Agrobacterium tumefaciens strain A281, an L,L-succinamopine strain. The authors tested virulence of T-DNA and vir region constructs from this tumor-inducing (Ti) plasmid with complementary Ti plasmid regions from heterologous nopaline and octopine strains.

56 BIOMEDICAL SCIENCES, APPLIED STUDIES

5601 Radiation Effects

REFER ALSO TO CITATION(S) 32704

33894 **(BNL—39748) Iron and iron derived radicals.** Borg, D.C.; Schaich, K.M. (Brookhaven National Lab., Upton, NY (USA)). Apr 1987. Contract AC02-76CH00016. 22p. (CONF-8704130—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010064.

From Conference on oxygen radicals and tissue injury; Augusta, MI, USA (27 Apr 1987).

We have discussed some reactions of iron and iron-derived oxygen radicals that may be important in the production or treatment of tissue injury. Our conclusions challenge, to some extent, the usual lines of thought in this field of research. Insofar as they are born out by subsequent developments, the lessons they teach are two: Think fast! Think small! In other words, think of the many fast reactions that can rapidly alter the production and fate of highly reactive intermediates, and when considering the impact of competitive reactions on such species, think how they affect the microenvironment (on the molecular scale) "seen" by each reactive molecule. 21 refs., 3 figs., 1 tab.

33895 **(BNL—39793) Experimental verification of photon: A program for use in x-ray shielding calculations.** Brauer, E.; Thomlinson, W. (Brookhaven National Lab., Upton, NY (USA)). 1987. Contract AC02-76CH00016. 12p. (CONF-870610—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE87010451.

From 5. national synchrotron radiation instrumentation conference; Madison, WI, USA (21 Jun 1987).

At the National Synchrotron Light Source, a computer program named PHOTON has been developed to calculate radiation dose values around a beam line. The output from the program must be an accurate guide to beam line shielding. To test the program, a series of measurements of radiation dose were carried out using existing beam lines; the results were compared to the theoretical calculations of PHOTON. Several different scattering geometries, scattering materials, and sets of walls and shielding materials were studied. Results of the measurements allowed many advances to be made in the program, ultimately resulting in good agreement between the theory and experiment. 3 refs., 6 figs.

33896 (CONF-860932—, pp 331-339) **Dose-rate models for human survival after exposure to ionizing radiation.** Jones, T.D.; Morris, M.D.; Young, R.W. Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

This paper reviews new estimates of the LD_{50} in man by Mole and by Rotblat, the biological processes contributing to hematologic death, the collection of animal experiments dealing with hematologic death, and the use of regression analysis to make new estimates of human mortality based on all relevant animal studies. Regression analysis of animal mortality data has shown that mortality is dependent strongly on dose rate, species, body weight, and time interval over which the exposure is delivered. The model has predicted human LD_{50}s of 194, 250, 310, and 360 rad to marrow when the exposure time is a minute, an hour, a day, and a week, respectively.

33897 (CONF-860932—, pp 341-344) **Radiation carcinogenesis following low-dose or low-dose-rate exposures.** Ullrich, R.L. Mar 1987. NTIS, PC A16/MF A01. File Number DE87007690.

From Radiological accidents, perspectives and emergency planning preparedness; Bethesda, MD, USA (15 Sep 1986).

A variety of dose responses have been observed for cancer induction following low linear energy transfer (LET) radiation. In general, however, the response is curvilinear, with a rapidly rising component in the intermediate dose range followed by a plateau or decline in incidence at high doses. The response is more linear at low doses, whereas the response at intermediate doses is approximated by a dose-squared relationship. Models for this response are based on the biophysical theory of cellular effects. However, many types of effects contribute to the tumorigenic processes, and host factors play a major role. At low dose rates the carcinogenic effect is generally reduced, which is caused by a dimunition of the dose-squared component and results in a linear response. Effects of fractionation can vary with total dose, fraction size, and fraction interval. High LET radiation is more tumorigenic. The dose-response relationships are more nearly linear and are less dose-rate dependent. The relative biological effectiveness (RBE) varies with dose, dose rate, fractionation, and target tissue.

33898 **(DOE/ER/60402—2) Radiation physics and biology: Progress report for period December 1, 1986-November 30, 1987.** Rubin, J.S. (ed.). (Columbia Univ., New York (USA). Radiological Research Lab.). Apr 1987. Contract FG02-86ER60402. 114p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE87009703.

This annual report describes progress made on 14 individual research projects. These projects fall naturally into theoretical biophysics, experimental microdosimetry and radiation biology. Each project has been separately abstracted for the Energy Data Base.

33899 **(DOE/EV/01671—93) Theory of RBE: Annual technical progress report, 1 January 1987 to 31 December 1987.** Katz, R. (Nebraska Univ., Lincoln (USA). Dept. of Physics). 1 Jun 1987. Contract AC02-76EV01671. 10p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010007.

This report describes research on several topics of importance to the theory of relative biological effectiveness. Topics covered include: (1) improvement in our knowledge of the radial distribution of dose about the path of an energetic heavy ion; (2) application of the new radial dose algorithm to different detectors, notably dry enzymes and viruses, the Fricke dosimeter, and alanine as a test of track theory; (3) preparation of new computer track simulations for thindown in nuclear emulsions, the spatial distribution of Fe^{3+} ions about heavy ion paths in the Fricke dosimeter, and the spatial distribution of inactivated virus molecules about heavy ion paths; (4) evaluation of radiosensitivity parameters for chromosome aberrations; (5) evaluation of radiosensitivity parameters for a variety of 1-hit detectors from first principles with the understanding that a different mechanistic model will be needed for each detector.

33900 **(DOE/EV/03408—T2) Physico-chemical studies of radiation effects in cells: Final report.** Powers, E.L. (Texas Univ., Austin (USA). Dept. of Zoology). Mar 1987. Contract AS05-76EV03408. 56p. The Univ. of Texas at Austin, Dept. of Zoology, Austin, Texas 78712. File Number TI87010232.

The career of Dr. E.L. Powers, a pioneer in the development of radiobiology, is reviewed. His initial research involved the effects of radiation and certain chemicals on Paramecium, associat-

ed ultrastructural studies on protozoan cells, responses of Rickettsia and bacteriophage to irradiation, and the development of techniques for studying bacterial spores. These efforts established the basic radiation biology of the spore and its importance in understanding the effects of free radicals, oxygen, and water. His recent research extended work on the dry spore to the very wet spore and to other selected chemical systems in aqueous suspension. 126 refs., 2 figs.

33901 (DOE/EV/04322—T5) **Mechanisms and secondary factors involved in the induction of radiation transformation in vitro.** Little, J.B. (Harvard Univ., Boston, MA (USA). School of Public Health). 1 Sep 1983. Contract AC02-77EV04322. 30p. NTIS, PC A03. File Number DE87008641.

The long term of this research program was to gain information concerning the mechanisms that determine the carcinogenic effects of ionizing radiation, particularly high LET radiation exposure. The experimental approach involves parallel studies of the induction of malignant transformation in BALB/3T3 cells and of specific gene mutations in human lymphoblastoid cells. Emphasis was on the biologic effects of internally incorporated Auger electron emitting radionuclides and the initiation of studies to determine the effects of low dose-rate neutron exposure. Auger electron irradiation sever as a model for high LET-type radiation effects and as an experimental tool for studying the effects of radiation at specific sites within the cell. Auger-emitting radiosotopes are commonly used in clinical nuclear medicine, rendering them a potential hazard to human populations. We examined the influence of cellular localization of Auger-emitting radionuclides and the spectrum of energy distribution in DNA on their mutagenic, cytogenetic, and transformational effects. The effects of ^{125}I (an energetic beta emitter) were compared. We studied the induction of cytogenetic changes by ^{125}I exposure of the cell membrane, as well as its potential to promote (enhance) transformation initiated by low dose external x-ray exposure. We will investigate the Relative Biological Effectiveness for mutagenesis and transformation of low doses of fast neutrons delivered continuously at variable low dose-rates. 34 refs., 1 tab.

33902 (IAEA-TECDOC—402, pp 11-17) **Present status of personnel dosimetry development at the National Atomic Energy Commission in Argentina.** Massera, G.E. (Comision Nacional de Energia Atomica, Buenos Aires, Argentina). Jan 1987. NTIS (US Sales Only), PC A11/MF A01. File Number DE87702284. (CONF-8504302—).

From Technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters; Vienna, Austria (22 Apr 1985).

Personnel dosimetry at the National Atomic Energy Commission in Argentina is described. Developments in the various detection techniques successively employed and investigated are presented. They include the use of photographic emulsions (films), thermoluminescent (TLD), radiophotoluminesent (RPL), solid-state nuclear track (SSNTD) and activation detectors for normal and accidental personnel dosimetry, as well as for other dosimetric needs. The mathematical modelling developed for dosimetric purposes is described. It includes absorbed dose distribution assessment in relevant organs, aimed at determining the effective dose equivalent or the absorbed dose distribution within the ICRU sphere for correlation with index quantities, along with physical simulation on adequate phantoms. Present calibration facilities are described and the set-up of a new calibration system is commented, as well as a participation in an intercomparison of film dosimeters. Trends constituting the basis of the various dosimetric programmes undertaken are described throughout this report.

33903 (IAEA-TECDOC—402, pp 19-24) **Personnel monitoring in Austria.** Strachotinsky, C. (Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H., Vienna, Austria). Jan 1987. NTIS (US Sales Only), PC A11/MF A01. File Number DE87702284. (CONF-8504302—).

From Technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters; Vienna, Austria (22 Apr 1985).

Personnel monitoring in Austria for about 22,000 occupational exposed persons is done by four Institutes, partly by TLDs and films. The Harshaw 2271 system, used by the Austrian Research Center Seibersdorf is specially described, also the following evaluation and the handling of the obtained dose values. The Research Center participates on some intercomparison programs in TL-dosimetry, for example, organized by PTB on the intercomparison program group of the US Department of Energy. A short description of these programs and the experiences with them are given. 5 references.

33904 (IAEA-TECDOC—402, pp 25-35) **Personal dosimetry in Canada. A perspective from CRNL.** Ing, H.; Jones, A.R.; Cross, W.G. (Atomic Energy of Canada Ltd., Chalk River, Ontario). Jan 1987. NTIS (US Sales Only), PC A11/MF A01. File Number DE87702284. (CONF-8504302—).

From Technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters; Vienna, Austria (22 Apr 1985).

A general description is given of the implementation of external radiation dosimetry in Canada and the particular role of the Chalk River Nuclear Laboratories. Dosimeters currently in use in Canada are described and research in areas of beta, gamma and neutron dosimetry are high-lighted. The participation of CRNL in various international intercomparisons is summarized. Recommendations are given regarding future work in personal dosimetry and the implementation of an international intercomparison for personal dosimetry. 27 references, 4 figures.

33905 (IAEA-TECDOC—402, pp 37-53) **Present status of personal neutron dosimetry in Czechoslovakia.** Nikodemova, D.; Hrabovcova, A.; Prouza, Z. (Research Institute of Preventive Medicine, Bratislava, Czechoslovakia; Charles Univ., Prague, Czechoslovakia). Jan 1987. NTIS (US Sales Only), PC A11/MF A01. File Number DE87702284. (CONF-8504302—).

From Technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters; Vienna, Austria (22 Apr 1985).

The paper discusses the problems of personal neutron dosimetry and their possible solution using solid state nuclear track detectors and albedo dosemeters. The technique used in operation practice in Czechoslovakia for neutron dose equivalent estimation is reviewed. The two-component dosemeter used in all-state personal dosimetry service is described. The dosemeter is composed of the Mylar detector sandwiched between two fissioning materials: intermetallic alloy of uranium and A1 and metallic thorium. The method of interpretation of the dose equivalent as well as the detection limits are given. For special applications in stray neutron fields with low energies (at atomic power station and geological logging working sites) the albedo dosemeter system was introduced. A number of different neutron sources with various moderators were used for albedo dosemeter calibration. For the neutron spectra determination the multisphere method was used. A calibration method using two polyethylene spheres (with diameters of 7,62 and 25,4 cm) was adopted. Three pairs of TLD are centred inside the spheres. This procedure allows to detect changes in the neutron fields where the albedo dosemeters are worn. The results of intercomparisons of neutron personal dosemeters conducted in the states of CMEA are presented. 20 references, 5 figures, 3 tables.

33906 (IAEA-TECDOC—402, pp 81-85) **Personnel dosimetry in France - Practice and research.** Portal, G. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92, France). Jan 1987. NTIS (US Sales Only), PC A11/MF A01. File Number DE87702284. (CONF-8504302—).

From Technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters; Vienna, Austria (22 Apr 1985).

The current state-of-the-art in the field of personnel dosimetry is reviewed. Photon, beta and neutron dosimetry techniques are dealt with separately. Current investigations into neutron dosimetry and the generation of reference radiations for calibrating dosemeters are presented together with information on the definition of operational quantities. 19 references.

33907 (IAEA-TECDOC—402, pp 87-100) **Personnel dosimetry and intercomparison studies in the GDR.** Kraus, W.; Will, W.; Rothe, W.; Rimpler, A. (Staatliches Amt fuer Atomsicherheit und Strahlenschutz, Berlin, German Democratic Republic). Jan 1987. NTIS (US Sales Only), PC A11/MF A01. File Number DE87702284. (CONF-8504302—).

From Technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters; Vienna, Austria (22 Apr 1985).

The following personnel dosemeters routinely used by the central monitoring service of the GDR are briefly described: photographic film dosemeter, TL finger ring dosemeter and neutron fission foil solid state track detector. Several national performance tests and other kinds of national intercomparisons confirming the suitability and reliability of these dosemeters in research and development work as well as after their introduction into the routine monitoring programs are mentioned. Of special importance are international intercomparisons of routinely used personnel dosemeters. They serve the purpose of quality testing and indicate necessary improvements of the dosemeter evaluation or the calibration. At least they are the basis of the comparability of the monitoring results of several countries. The GDR took part in many of such intercomparison studies, most of them implemented in the framework of the Council for Mutual Economic Assistance (CMEA) for gamma, X, beta and neutron radiation or mixtures of them. The results of the GDR in 3 multilateral and 8 CMEA intercomparison studies are dealt with, showing a sufficient accuracy of the personnel dosemeters routinely used in the national central monitoring service. Finally some recommendations are given for the continuation of international intercomparison studies. 13 references, 8 figures.

33908 (IAEA-TECDOC—402, pp 101-112) **Dosimetric services intercomparison and qualification procedures in Italy.** Cavallini, A. (ENEA, Bologna, Italy). Jan 1987. NTIS (US Sales Only), PC A11/MF A01. File Number DE87702284. (CONF-8504302—).

From Technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters; Vienna, Austria (22 Apr 1985).

Since the early '60's the specialists of the major personal dosimetry services in Italy met at regular intervals under the auspices of ENEA (formerly CNEN). The aim was to exchange views and to set up intercalibration programs aimed at spotting and possibly solving technical and management problems of the services, then mostly based on photographic films. In particular the following items have been examined in detail: 1) Preparation of the calibration curves; 2) Interpretation of the individual dosimeter data; 3) File structure and record keeping; 4) Qualification of services. This paper describes the activities and the conclusions reached by the Group on these matters. The heading "Qualification" means the establishment of procedures to test dosimetry methods aimed at controlling the reliability of dosimetric services at a nationwide level, and the identification of the best techniques for suggestion to the national services. With "Record keeping" the Group proposes the setting up of a National Data Base of dosimetric results for statistical analysis. The preparation of the calibration curves is directed to the standardization of the calibration procedures among the services. Under the heading "Interpretation of the individual dosimetric data" are grouped the discussions on the unification of the format of result transmission to the users. Now the Group has been officially recognized by ENEA and charged of the task of approving the Italian dosimetric services. 15 references, 2 figures, 10 tables.

33909 (IAEA-TECDOC—402, pp 113-120) **Current status of the personnel dosimeters in Japan.** Minami, K.; Tamura, K.; Murakami, H. (Japan Atomic Energy Research Institute, Tokai, Ibaraki). Jan 1987. NTIS (US Sales Only), PC A11/MF A01. File Number DE87702284. (CONF-8504302—).

From Technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters; Vienna, Austria (22 Apr 1985).

For the radiation protection of workers in gamma, beta and neutron exposure there are several types of dosimeters available, such as film badge, TLD badge and track detector. Of these, the film badge (e.g. a film for gamma and beta, and Kodak NTA film for fast neutrons) is the largest and most widely employed. In this paper, personnel monitoring using dosimeters in Japan and some characteristics of it are described, particularly with the film badge. 5 references, 7 figures, 2 tables.

33910 (IAEA-TECDOC—402, pp 121-128) **Status of the personnel dosimetry service of the National Institute of Radiation Hygiene in Norway, including practical experience from a Scandinavian intercomparison study.** Woehni, T. (National Institute of Radiation Hygiene, Oesteraas, Norway). Jan 1987. NTIS (US Sales Only), PC A11/MF A01. File Number DE87702284. (CONF-8504302—).

From Technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters; Vienna, Austria (22 Apr 1985).

A status report of the nationwide personnel monitoring service at the National Institute of Radiation Hygiene (SIS) in Norway is presented, together with the results from a Scandinavian intercomparison study. The personnel dosimetry service at SIS covered approx. 5,200 workers in 1983, corresponding to 70% of all occupational exposed individuals being monitored. The service covers mainly medical and industrial radiography, but also various other applications within medicine and industry. Nuclear installations are not included. The collective doses for 1983 amount to 4.7 manSv for medical occupations, and 1.1. manSv for industrial radiography. These figures include estimates of the unrecorded collective doses below the detection limit, calculated on the basis of log-probability distributions. A Scandinavian filmbadge intercomparison study was performed in spring 1984. The random uncertainty of the filmbadge measurements was below 20% for all countries, and the total uncertainty was within the factor of 2 as recommended by the ICRP. 5 references, 4 figures.

33911 (IAEA-TECDOC—402, pp 129-139) **Personnel dosimetry carried out by the Central Laboratory for Radiological Protection in Poland - Practice, research and experience.** Jasiak, J. (Central Laboratory for Radiological Protection, Warsaw, Poland). Jan 1987. NTIS (US Sales Only), PC A11/MF A01. File Number DE87702284. (CONF-8504302—).

From Technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters; Vienna, Austria (22 Apr 1985).

The Central Laboratory for Radiological Protection (CLOR) carries out a centralized personnel monitoring service for radioisotope laboratories and nuclear installations in Poland. The number of persons recently monitored by film method is 7200. According to the results obtained - about 93 per cent of the persons monitored obtained yearly doses below 5 mSv and about 0.24 per cent received doses exceeding 50 mSv. The mean annual dose equivalents calculated for the persons working in industrial establishments in the years 1980-1982 were almost twice as high as the mean value for the whole group monitored. The largest number of cases of 50 mSv dose exceeding have been noted in industrial establishments, namely in the work with radiographic facilities. To improve the method of gamma, X-ray, X-ray + gamma radiation dose evaluation in routine monitoring a dosimetric program has been modified to use with computer Mera 400. To check and to improve the accuracy of the methods used in personnel dosimetry CLOR has participated in several international intercomparison studies. The results have shown that the precision of photon radiation dose measurements by film and TL methods is satisfactory at present. 9 references, 2 figures, 4 tables.

33912 (IAEA-TECDOC—402, pp 147-159) **Status of personal dosimetry in the United Kingdom.** Marshall, T.O. (National Radiological Protection Board, Chilton, England). Jan 1987. NTIS (US Sales Only), PC A11/MF A01. File Number DE87702284. (CONF-8504302—).

From Technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters; Vienna, Austria (22 Apr 1985).

At present personnel monitoring is carried out in the UK in accordance with Regulations and Codes of Practice. In the near future these will be replaced by new Regulations. About 120,000 persons wear personal dosemeters issued by some 47 laboratories.

The main requirement is for body monitoring for X-, beta- and gamma-radiations performed by photographic film and thermoluminescent dosemeters. In addition, small percentages of the total monitored receive extremity or neutron dosemeters. Substantial effort is being applied to research in personnel dosimetry in new materials, dosemeters and dosimetry systems. No intercomparison exercises have been carried out in the UK since 1971 but the larger laboratories have taken part in the CEC Intercomparison program from which useful information has emerged. 6 references, 6 figures, 2 tables.

33913 (IAEA-TECDOC—402, pp 197-205) **System of personal nuclear accident dosimetry of photon or mixed neutron plus gamma radiation.** Dvornik, I.; Miljanic, S.; Ranogajec-Komor, M.; Vekic, B. (Institut Rudjer Boskovic, Zagreb, Yugoslavia). Jan 1987. NTIS (US Sales Only), PC A11/MF A01. File Number DE87702284. (CONF-8504302—).

From Technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters; Vienna, Austria (22 Apr 1985).

An accurate, simple and reliable system of neutron or gamma radiation personal dosimetry for nuclear accidents is developed based on the commercial emergency dosimeter DL-M4 which is tissue equivalent for photon or mixed (n+gamma) radiation fields of all practically important energy spectra. The DL-M4 dosimeter measures neutron plus gamma total tissue absorbed dose directly. The pencil of the dosimeter may contain a chip (1 mm O.D. x 4 mm) of /sup 7/LiF or other neutron insensitive thermoluminescent material for separate measurement of the gamma component of total dose. The addition of ^{6}LiF (or natural LiF) would help to measure neutron albedo which can indirectly give sufficient information in the low neutron or gamma dose range not measurable by DL-M4. Two such dosimeter sets carried on opposite sides of the body will accurately and immediately measure the maximum surface dose. Some additional sets can give the minimum dose too, which allows the approximate determination of organ doses and the precise enough forecast of radiation damage to the irradiated person. In the 1 to 10 Gy dose range the DL-M4 alone (maximum and minimum total doses) gives enough information for quick protective actions. 6 references.

33914 (IAEA-TECDOC—402, pp 221-238) **Personnel monitoring at CERN. Experience and future outlook.** Hoefert, M. (European Organization for Nuclear Research, Geneva, Switzerland). Jan 1987. NTIS (US Sales Only), PC A11/MF A01. File Number DE87702284. (CONF-8504302—).

From Technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters; Vienna, Austria (22 Apr 1985).

There are several reasons why personnel dosemeters at CERN are more important for their monitoring than for their dosimetric capabilities. In spite of the fact that personnel doses have decreased considerably over the years, individual monitoring for a large number of people is essential. In addition, it is necessary to understand fully the response of the detectors used for the various types of radiation encountered at CERN. To this end the Personnel Dosimetry Section participates in routine performance tests of personnel dosemeters, as well as in new calibration procedures, also in view of the introduction of new quantities for the assessment of risks from external radiation. Both past experience with the film dosemeters currently used and new approaches in personnel monitoring are described. 18 references, 6 figures, 8 tables.

33915 (INIS-mf—10889, pp 55) **Induced gynogenesis by retention of the second polar body in common tench, Tinca tinca L. .** Linhart, O.; Kvasnicka, P.; Kanka, J.; Pipota, J. (Vyzkumny Ustav Rybarsky, Vodnany, Czechoslovakia; Ceskoslovenska Akademie Ved, Prague; Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33916 (INIS-mf—10889, pp 9) **Electronic perturbation induced by ionizing radiation in biological matter.** Bednar, J. (Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33917 (INIS-mf—10889, pp 56) **Induced gynogenesis by retention of the second polar body in the common carp, Cyprinus carpio L., and heterozygosity of gynogenetic progeny in transferrin and Ldh-B^{1} loci.** Linhart, O.; Kvasnicka, P.; Pokorny, J.; Slechtova, V. (Vyzkumny Ustav Rybarsky, Vodnany, Czechoslovakia; Ceskoslovenska Akademie Ved, Prague). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

33918 (INIS-mf—10904, pp 31) **Causes of human tumor radioresistance.** Tubiana, M. 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33919 (INIS-mf—10904, pp 31) **Clinical trials of radiosensitizers.** Dische, S. (Mount Vernon Hospital, Northwood, England). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33920 (INIS-mf—10904, pp 217) **Preliminary correlation of tumor response to radiotherapy with tissue levels of glutathione per unit oxygen consumption.** Roseman, J.; Acuff, R. (Tennessee State Planning Office, Johnson City). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33921 (INIS-mf—10904, pp 218) **Comparative study of dose distribution of a high-energy electron beam and chromosome aberration frequencies.** Matsubara, S.; Kuwabara, Y.; Horiuchi, J.; Suzuki, S.; Hoshina, M.; Kato, T. (Tokyo Medical and Dental Univ., Japan). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33922 (INIS-mf—10904, pp 233) **Radiation targets and dose-response relationships.** Koeteles, G.J.; Almassy, Zs.; Kubasova, T.; Somosy, Z. (Orszagos Frederic Joliot-Curie Sugarbiologiai es Sugaregeszseguegyi Kutato Intezet, Budapest, Hungary). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33923 (INIS-mf—10904, pp 233) **Re-irradiation of tissues: dose-response relationships.** Hendry, J.H. (Christie Hospital and Holt Radium Institute, Manchester, England). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33924 (INIS-mf—10904, pp 234) **Fraction size and iso-effect relationships for early and late normal tissue responses in a clinical study of breast cancer patients treated with post-operative radiotherapy.** Overgaard, M. (Radiumstationen for Jylland, Aarhus, Denmark). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33925 (INIS-mf—10904, pp 304) **Dose dependent effect of radiation on microvasculature.** Krishnan, E.C.; Krishnan, L.; Jewell, W.R. (Kansas Univ., Kansas City). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33926 (INIS-mf—10904, pp 304) **Repair of radiation damages in tumor cells in dependence on their oxygenation.** Pelevina, I.I.; Afanasev, G.G.; Gulverdashvili, N.A. (Institute Khimicheskoj Fiziki, Moscow, USSR). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33927 (INIS-mf—10904, pp 10) **Cancer incidence among A-bomb survivors.** Kato, H. (Radiation Effects Research Foundation, Hiroshima, Japan). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33928 (INIS-mf—10904, pp 10) **Significance of human epidemiological studies for setting radiation protection standards.** Sztanyik, L.B. (Orszagos Frederic Joliot-Curie Sugarbiologiai es Sugaregeszseguegyi Kutato Intezet, Budapest, Hungary). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33929 (INIS-mf—10904, pp 11) **Radiation induced neoplastic diseases in Thorotrast patients - results of the German Thorotrast Study.** Kaick, G. van. (Deutsches Krebsforschungszentrum, Heidelberg, Germany, F.R.). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33930 (INIS-mf—10904, pp 11) **Exposure to radon in houses and lung cancer - epidemiologic evidence.** Pershagen, G. (National Institute of Environmental Medicine, Stockholm, Sweden). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33931 (INIS-mf—10904, pp 11) **Long term comparative mortality and morbidity following scalp irradiation in childhood.** Modan, B.; Ron, E.; Alfandary, E.; Boice, J. Jr.; Katz, L. (Sheba Medical Center, Tel Hashomer, Israel). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33932 (INIS-mf—10904, pp 11) **Radiation induced cancer in Japan.** Yamashita, H.; Hashimoto, S.; Sakai, K. (Keio Univ., Tokyo, Japan; Niigata Univ., Japan). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33933 (INIS-mf—10904, pp 217) **Radiation associated thyrotoxicosis.** Shimaoka, K.; Katayama, S.; Osman, G.; Piver, M.S.; Tsukada, Y.; Suh, O. (Roswell Park Memorial Institute., Buffalo, NY). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33934 (INIS-mf—10904, pp 219) **Experimental and clinical studies of radiosensitizer Tinidazol.** Baran, L.A.; Vinnitskaja, V.K.; Kasyanenko, I.V.; Nonko, V.D.; Rudakov, N.P.; Dovbishchenko, V.A.; Goldshmid, B.Ya.; Levchenko, A.M.; Erusalimskij, E.L. (Nauchno-Issledovatel'skij Rentgeno-Radiologicheskij i Onkologicheskij Inst., Kiev, Ukrainian SSR). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33935 (INIS-mf—10904, pp 222) **Postradiation lung reactions in patients with breast cancer treated with telecobalt-60 in comparison with patients treated with x-rays.** Malinowski, Z.; Zomer, J.; Skowronska-Gardas, A.; Sochacka, B.; Smorczewska, M.; Nowak, G. (Maria Sklodowska-Curie Memorial Institute, Warsaw, Poland). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33936 (INIS-mf—10904, pp 223) **Incidence of infectious symptoms after radiotherapy for breast cancer: long term effects.** Rotstein, S.; Blomgren, H.; Baral, E.; Lax, I.; Israelsson, A.; Nilsson, B.; Petrini, B.; Wasserman, J. (Karolinska Sjukhuset, Stockholm, Sweden; Stockholm County Council, Sweden). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33937 (INIS-mf—10904, pp 462) **Low- and high LET external beam irradation treatment planning for the parotid malignancies: methods and rationale.** Kovacs, G.; Merkle, Kh.; Welker, K. (Weil Emil Korhaz-Rendeloeintezet, Budapest, Hungary; Zentralinstitut fuer Krebsforschung, Berlin, Germany, F.R.). 1986. NTIS (US Sales Only), PC A21/MF A01. File Number DE87702300. (CONF-8608169—Vol.1-Absts.).

From 14. international cancer congress; Budapest, Hungary (21 Aug 1986).

33938 (JINR-R—19-86-416) **Lethal effect of accelerated heavy ions on mammalian cells in the presence or absence of DNA synthesis inhibitors. The results of experimental investigation.** Govorun, R.D.; Nasonova, E.A.; Krasavin, E.A.; Kozubek, S.; Cherevatenko, A.P. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1986. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702383.

Submitted to the journal Radiobiologiya.

The radiosensitivity of Chinese hamster cells to γ-irradiation (^{137}Cs) and accelerated heavy ions of ^{4}He (L=22 and 60 keV/μm), ^{12}C (L=231 keV/μm), and ^{20}Ne (L=690 keV/μm) was studied in standard conditions and in the presence of arabinosid cytosine with hydroxyurea. These agents sensibilized the cells in the case of γ-irradiation. The effect decreases with increasing LET sharply and

no sensibilization could be detected after irradiation with ^{12}C and ^{20}Ne ions. Maximum radiosensitivity of cells has been observed after irradiation with ^{4}He ions (L=60 keV/μm). The values of RBE for heavy ions decreased after irradiation in the presence of arabinosid cytosine with hydroxyurea. The mechanism of this phenomenon is discussed. 19 references, 2 figures, 2 tables.

33939 **(JINR-R—19-86-417) Lethal effect of accelerated heavy ions on mammalian cells in the presence or absence of DNA synthesis inhibitors. Theoretical analysis.** Kozubek, S.; Krasavin, E.A.; Govorun, R.D.; Nasonova, E.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1986. 10p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702384.

Submitted to the journal Radiobiologiya.

The dependence of the radiosensitivity (D_0^{-1}) of Chinese hamster cells on linear energy transfer (L) in the presence or absence of arabinosid sytosine with hydroxyurea has been analysed in terms of both Gunther - Schultz and our new model. The correspondence between experimental and theoretical survival curves, D_0^{-1} (L) is not described satisfactorily by the Gunther - Schultz model. On the other hand, our model describes experimental data reasonably well. 6 references, 2 figures, 4 tables.

33940 (N—87-17760, pp vp) **Natural radiation hazards on the manned Mars mission.** Letaw, J.R.; Silberberg, R.; Tsao, C.H. May 1986. NTIS, PC A24/MF A01. (NASA-TM—89321-VOL-2; NAS—1.15:89321-VOL-2; CONF-8506149—Vol.2).

From Manned mars mission workshop; Huntsville, AL, USA (10 Jun 1985).

The hazards of the natural radiation environment (cosmic rays and solar energetic particles) on a manned mission to Mars are considered. These hazards are addressed in three different settings: the flight to Mars where the astronauts are shielded only by the spacecraft; on the surface of Mars under an atmosphere of about 10 g/sq cm carbon dioxide; and under the surface of Mars where additional shielding would result.

33941 **(ORNL—6378) Summary and analsysis of the 1986 ORNL personnel dosimetry intercomparison study.** Swaja, R.E.; Weng, P.S.; Sims, C.S.; Yeh, S.H. (Oak Ridge National Lab., TN (USA)). Apr 1987. Contract AC05-84OR21400. 72p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87009770.

The Twelfth Personnel Dosimetry Intercomparison Study was conducted at the Oak Ridge National Laboratory (ORNL) during April 14 to 17, 1986. Objectives of this study were to determine neutron dosimeter performance characteristics at neutron dose equivalent levels near the minimum specified for accreditation testing programs and to provide several radiation fields different from those that have been considered in prior ORNL intercomparisons. Dosimeter badges from 49 participating organizations were mounted on Lucite block phantoms and exposed to six mixed-radiation fields (five using the Health Physics Research Reactor and one using a PuBe source) with neutron dose equivalents of about 1.5 mSv and gamma dose equivalents between 0.04 and 5.37 mSv. Results of this study indicated that participants had no difficulty obtaining measurable indication of neutron exposure at dose equivalent levels of about 1.5 mSv. Average neutron results for all dosimeter types were within approximately 60% of reference values with hard spectra being more accurately measured than soft spectra. Considering all irradiations, albedo and direct interaction TLD systems provided about the same performance characteristics. With regard to precision, about 58% of the reported neutron results had single standard deviations within 10% at the means which indicates that precision was not a problem relative to accuracy for over half of the participants. Average gamma results varied from 0.98 to 2.22 times reference values for all exposures with TLD systems being more accurate than film. Some participants, especially those using film, had difficulty obtaining measurable indication of gamma exposures at dose equivalent levels lower than 0.09 mSv. About 69% of all neutron results and 77% of all gamma results met regulatory standards for measurement accuracy and approximately 65% of all neutron data satisfied national dosimetry accreditation criteria for accuracy plus precision. 18 refs., 1 fig., 30 tabs.

33942 **(PNL—6100-Pt.1) Pacific Northwest Laboratory: Annual report for 1986 to the DOE Office of Energy Research: Part 1, Biomedical sciences.** Park, J.E. (Pacific Northwest Lab., Richland, WA (USA)). Feb 1987. Contract AC06-76RL01830. 120p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE87010024.

This report summarizes progress on OHER biomedical and health-effects research conducted at PNL in FY 1986. The research develops the knowledge and scientific principles necessary to identify, understand and anticipate the long-term health consequences of energy-related radiation and chemicals. Our continuing emphasis is to decrease the uncertainty of health-effects risk estimates from existing and/or developing energy-related technologies through an increased understanding of how radiation and chemicals cause health effects. The report is arranged to reflect the PNL research relative to OHER programmatic structure. The first section, on human health effects, concerns statistical and epidemiological methods for assessing health risks among nuclear workers. The next two sections, which contain reports of health-effects research in biological systems, include effects of radiation and of energy-related chemicals. The last section is related to medical applications of nuclear technology.

5603 Chemicals Metabolism And Toxicology

REFER ALSO TO CITATION(S) 32465, 32703, 33654, 33714, 33881, 33884, 33942

33943 **(CONF-8704125—1) Environmental exposure to N-aryl compounds.** Guerin, M.R.; Buchanan, M.V. (Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 9p. NTIS, PC A02. File Number DE87010392.

From 3. international conference on carcinogenic and mutagenic N-substituted aryl compounds; Dearborn, MI, USA (25 Apr 1987).

N-aryl compounds are well-known occupational exposure hazards but are relatively unstudied as an environmental exposure problem. Coal-derived liquid fuels and environmental tobacco smoke are examples of materials potentially leading to significant environmental exposures to aryl amines. Integrated chemical class separation and bacterial mutagenicity testing identified primary aromatic amines as the major contributors to the mutagenicities of crude coal liquids. Studies of sidestream cigarette smoke chemistry show that alkaline constituents of cigarette smoke are preferentially released into the environment as compared to that drawn into the mouth by the smoker. Two to ten times the quantity of aromatic amines are released in the sidestream smoke on a per cigarette basis. Quantities of the more mutagenic and carcinogenic multi-ring aryl amines in both coal liquids and in cigarette smoke are very small and they are accompanied by a wide variety of related compounds. Chemical ionization mass spectrometric methods have been developed to distinguish between closely related amines to facilitate their identification and quantitation at trace levels.

33944 **(DOE/EV/04746—24) Ionization in liquids: Progress report, November 1, 1984-October 31, 1987.** Bakale, G. (Case Western Reserve Univ., Cleveland, OH (USA). Dept. of Radiology). 22 May 1987. Contract AC02-78EV04746. 57p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87009889.

The objectives of this research were to study electron transport and reactions in model liquids and micellar and biological systems. Pulse-conductivity techniques were used to study physicochemical effects on electron attachment and conduction and to measure carcinogen electron-attachment properties in liquids. The biological aspects of the program were conducted through biological studies of radiation-induced damage to DNA with emphasis on the mechanism of the DNA-damage process. The information obtained from the study of electron-micelle interactions pertaining to diffusion-controlled reaction theory will be applied to our carcinogen-screening studies as well as to our studies of electron attachment and transport in mixtures of model liquids. The comparison of the k/sub e/$^-$ and Ames-test responses to a mixture of environmental carcinogens and the apparent correlation that was observed be-

tween the two tests suggests that the k/sub e/-test may be a cost-effective means of screening chemical carcinogens. 138 refs., 1 tab.

33945 **(DOE/OR/21596—T1) Estimation of the bioaccumulation of mercury by bluegill sunfish in East Fork Poplar Creek: Final report for the period 1 October 1985-30 April 1987.** Young, R.C. (Tennessee Valley Authority, Knoxville (USA). Office of Natural Resources and Economic Development). Apr 1987. Contract AI05-86OR21596. 47p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87009948.

Studies conducted by Van Winkle, et al., (1984), on East Fork Poplar Creek (EFPC) documented the system to be contaminated by mercury originating from the Department of Energy's Y-12 Plant. Specifically, the study showed that the fine sediments in the stream were significantly contaminated with mercury; the mercury contamination was highest near the Y-12 discharge and decreased in downstream sediments, and fish in the system had mercury concentrations in muscle tissue exceeding FDA limits of 1.0 ppM.

33946 **(GSF—25/86) In vitro test systems for the identification of gentoxic chemicals in the human environment: The proof of DNA repair synthesis in liver cells.** Rossberger, S. (Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen , Neuherberg (Germany, F.R.). Inst. fuer Toxikologie). 1986. 96p. (In German). NTIS (US Sales Only), PC A05/MF A01. File Number DE87751913.

This work examines the possibilities of proving a DNA repair by gentoxic chemicals in primary hepatocytes and 2sFou liver cells of rats. Two different processes used for the in vitro mutagenic testing of alien substances for determining the DNA repair synthesis in primary hepatocytes, in the autoradiographic method and the gradient centrifuging method, are compared regarding their reliability and sensitivity. The rat hepatom cell line 2sFou was examined for its suitability for proving chemically induced DNA repair, instead of primary hepatocytes.

33947 **(LMF—115) Inhalation Toxicology Research Institute: Annual report, October 1, 1985 through September 30, 1986.** Muggenburg, B.A.; Sun, J.D. (eds.). (Inhalation Toxicology Research Inst., Albuquerque, NM (USA)). Dec 1986. Contract AC04-76EV01013. 510p. NTIS, PC A22/MF A01; 1; GPO Dep. File Number DE87009807.

The first section of this report contains papers related to aerosol generation and characterization. Among the papers in this section, one addresses the evaluation of the particles deposited near the Soviet Chernobyl nuclear reactor accident and provides insight into the nature of the radioactivity released from the reactor and its potential health effects. The second section includes papers describing the deposition and fate of inhaled materials. It contains discussions of the metabolic fate of important chemical and radioactive materials. The third section, dose-response relationships for inhaled radionuclides and the fourth section, dose-response relationships for inhaled chemical toxicants, deal with the health effects from inhaled materials. A number of these papers are updates of life span studies in dogs and in rodents. The final section, biological factors that influence dose-response relationships, contains papers dealing with a broad range of significant biological relationships that need evaluation in order to understand the complex interactions between dose and the produced effects. For those who would like to obtain a quick overview of the Institute's research, a brief summary, highlighting some of the important findings, is at the beginning of each section.

33948 **(ORNL/TM—10472) Test of carcinogenicity in mouse skin: Methylenedianiline, γglycidyloxytrimethyloxysilane, γaminopropyltriethoxysilane and a mixture of m-phenylenediamine, methylenedianiline, and diglycidylether of bisphenol-A.** Holland, J.M.; Smith, L.H.; Frome, E.; Whitaker, M.J.; Gipson, L.C.; Fry, R.J.M. (Oak Ridge National Lab., TN (USA)). Jun 1987. Contract AC05-84OR21400. 41p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87010421.

Application of graded concentrations of four test substances in acetone to the skin of C3H mice five times a week resulted in the following: γaminopropyltriethoxysilane at concentration of 100 and 50 wt/vol % was a severe and mild skin irritant in female C3Hf/Bd respectively and in males a mild skin irritant. Methylenedianiline at a concentration of 10 wt/vol % in methanol killed 4/9 females and 1/9 males. When acetone was the solvent 3/10 females and 3/10 males died within 2 weeks. No mortality or skin damage occurred with γglycidyloxytrimethyloxysilane or the mixture of m-phenylenediamine, methylenedianiline and diglycidylether of bisphenol A (MDA). A study of the effects of a two-year, three times a week, topical application of the four test materials revealed no significant increase in skin tumors. The incidence of liver tumors appeared to be increased by exposure to methylenedianiline and with the mixture (MDA). Significant and dose-dependent increases in mortality were found in male mice with MDA and increased mortality at the highest dose (10.8 mg/week) in females. In the case of methylenedianiline excess mortality was found in both sexes. The precise cause of excess mortality from dermal absorption of the materials applied over a two-year period was not established. 5 refs., 12 figs., 12 tabs.

33949 **(PB—87-165106/XAB) Physiological responses of healthy human subjects consequent to inhalation of NO_2, O_3, and NO_2 plus 03 during heavy, sustained exercise. Final report, 9 November 1984-9 November 1986.** Adams, W.C. (California Univ., Davis (USA). Human Performance Lab.). 17 Oct 1986. 139p. NTIS, PC A07/MF A01.

The main goal of this project was to study the role of exercise and gender in a person's sensitivity to the effects of nitrogen dioxide, ozone, or a combination of the two pollutants. Healthy young adult subjects engaged in 60 minutes of heavy bicycle ergometer exercise while inhaling pollutants through a mouthpiece. Major findings were: heavy exercise does not seem to increase subject sensitivity to inhaled NO_2 (0.6 ppm) or to a combination of NO_2 and O_3 (0.3 ppm) with respect to the parameters that were measured (pulmonary function tests, symptoms, and exercise ventilatory pattern); inflammation and neural responses are important underlying factors in the response to O_3 as measured by the above parameters; women and men, when exercising at the same relative instensity, do not show gender based differences in sensitivity to the effects of O_3, NO_2, or a combination of the two pollutants; duration of enhanced responsiveness upon reexposure to O_3 (0.35 ppm) appears to last up to 48 hours with variation between individuals; and prior exposure to O_3 (0.3 ppm) does not affect the response to NO_2 (0.6 ppm) or to a combination of NO_2 and O_3 over that which can be attributed to O_3 alone.

33950 **(PB—87-167763/XAB) Impact of ozone on field-corn yield.** Kress, L.W.; Miller, J.E. (Argonne National Lab., IL (USA)). 1985. 10p. NTIS, PC A02/MF A01.

Field corn(Zea mays L.) is the most important agricultural crop in the U.S. and the major production areas are subjected to potentially damaging concentrations of ozone (O_3). Since no information was available regarding the sensitivity of field-corn hybrids grown in the Midwest, plants of two hybrids were field grown in open-top chambers and exposed to O_3 for 83 days to determine its impact on grain yield. The air chamber was either charcoal filtered or non-filtered with various constant amounts of O_3 added to the ambient air from 0900 to 1600 CST. Also included was a nonchambered plot. A randomized complete block design incorporated 3 replicates of 7 treatments. Foliar injury was noted on some plants at the elevated O_3 concentrations but was never more than 5% on an individual leaf. Analysis of variance of the data indicated significant ozone effects on overall grain yield, 100-seed weight, seeds per cob, cob weight, and cob length, for both hybrids.

33951 **(UCRL—96658) Prediction of risk from indoor exposure to tetrachloroethylene: Pharmacokinetic considerations under steady-state and dynamic exposure conditions.** Bogen, K.T.; McKone, T.E. (Lawrence Livermore National Lab., CA (USA)). 14 May 1987. Contract W-7405-ENG-48. 19p. (CONF-870695—4). NTIS, PC A02/MF A01; GPO Dep. File Number DE87010335.

From 80. annual meeting of the Air Pollution Control Association; New York, NY, USA (1 Jun 1987).

Steady-state analysis of the PB-PK model used here provides several simple relationships that are directly relevant to risk assessment for VOC's subject to metabolism. In particular, such an analy-

sis provides an upper bound on the amount of inhaled chemical that is capable of being metabolized. We have further demonstrated that, for respiratory PCE exposure at indoor air concentrations arising from typical levels of PCE contamination in well water, and conditional on a given set of metabolic parameter estimates, metabolized dose can be approximated closely using estimated time-weighted average PCE concentrations with a PB-PK model under steady-state assumptions, despite the large temporal fluctuations in concentration associated with a realistic indoor exposure scenario and the large degree of uncertainty in parameter estimates for PCE metabolism in humans. 22 refs., 9 figs., 2 tabs.

33952 **Response of Eriophorum vaginatum to elevated CO_2 and temperature in the Alaskan tussock tundra.** Tissue, D.T.; Oechel, W.C. (San Diego State Univ., CA). *Ecology;* 68: No. 2, 401-410(Apr 1987). Contract AC03-82ER60079.

Small greenhouses were used in the arctic to maintain Eriophorum vaginatum-dominated tussock tundra for 10 wk at ambient CO_2 (340 μL/L), elevated CO_2 (510 or 680 μL/L), or elevated CO_2 and 4°C above ambient temperature (680 μL/L, ambient +4°). These treatments represent present levels of atmospheric CO_2 and temperature, and those predicted for the next century. Within 3 wk, plants maintained at elevated CO_2 exhibited a physiological adjustment of their photosynthetic rate so that plants grown at ambient and elevated CO_2 levels had similar photosynthetic rates at their respective growth CO_2 concentrations. The reduction in photosynthetic capacity for plants grown at elevated CO_2 levels did not appear to be due to stomatal closure or end-product inhibition. Other possible mechanisms were not explored. Transpiration rates and water use efficiency did not differ among treatments in the generally wet environment of tussock tundra. Relative leaf growth rate and the seasonal pattern of growth were also unaltered, suggesting that the growth of mature tillers is not, under normal ambient conditions, limited by temperature or carbohydrate. However, new tiller production was significantly increased at elevated CO_2, suggesting that the long-term effect of CO_2 enhancement in this sedge may be the production of a greater number of new tillers rather than an increase in the size or productivity of existing tillers.

33953 **Drought stress and elevated CO_2 effects on soybean ribulose bisphosphate carboxylase activity and canopy photosynthetic rates.** Vu, J.C.V.; Allen, L.H. Jr.; Bowes, G. (Univ. of Florida, Gainesville). *Plant Physiology;* 83: No. 3, 573-578(Mar 1987). Contract AI01-81ER60001.

Soybean (Glycine max [L.] cv Bragg) was grown at 330 or 660 microliters CO_2 per liter in outdoor, controlled-environment chambers. When the plants were 50 days old, drought stress was imposed by gradually reducing irrigation each evening so that plants wilted earlier each succeeding day. On the ninth day, as the pots ran out of water CO_2 exchange rate (CER) decreased rapidly to near zero for the remainder of the day. Both CO_2-enrichment and drought stress reduced the total (HCO_3^-/Mg^{2+}-activated) extractable ribulose-1,5-bisphosphate carboxylase (RuBPCase) activity, as expressed on a chlorophyll basis. In addition, drought stress when canopy CER values and leaf water potentials were lowest, reduced the initial (nonactivated) RuBPCase activity by 50% compared to the corresponding unstressed treatments. This suggests that moderate to severe drought stress reduces the in vivo activation state of RuBPCase, as well as lowers the total activity. It is hypothesized that stromal acidification under drought stress causes the lowered initial RuBPCase activities. The K/sub m/(CO_2) values of activated RuBPCase from stressed and unstressed plants were similar; 15.0 and 12.6 micromolar, respectively. RuBP levels were 10 to 30% lower in drought stressed as compared to unstressed treatments. However, RuBP levels increased from near zero at night to around 150 to 200 nanomoles permilligram chlorophyll during the day, even as water potentials and canopy CERs decreased.

33954 **Decrease of pH gradients in tonoplast vesicles by NO_3p and Cl^-: evidence for H^+-coupled anion transport.** Schumaker, K.S.; Sze, H. (Univ. of Maryland, College Park). *Plant Physiology;* 83: No. 3, 490-496(Mar 1987). Contract AS05-82ER13015.

Chloride or nitrate decreased a pH gradient (measured as [^{14}C]methylamine accumulation) in tonoplast-enriched vesicles. The ΔpH decrease was dependent on the anion concentration. These effects are independent of the anion-sensitive H^+-ATPase of the tonoplast, since the pH gradient (acid inside) was imposed artificially using a pH jump or a K^+ gradient and nigericin. 4,4'-Diisothiocyano-2,2'-stilbene disulfonic acid partially prevented the decrease in pH gradient induced by Cl^-. Two possible models to account for this anion-dependent decrease of ΔpH are: (a) H^+ loss is accompanied by Cl^- or NO_3^- efflux from the vesicles via H^+/anion symport systems on the tonoplast and (b) H^+ loss is accompanied by Cl^- or NO_3^- uptake into the vesicles via H^+/anion antiport systems. Depending on the requirements and conditions of the cell, these two systems would serve to either mobilize Cl^- and NO_3^- stored in the vacuole for use in the cytoplasm or to drive anions into the vacuole. Chloride or nitrate also decreased a pH gradient in fractions containing plasma membrane and Golgi, implying that these membranes may have similar H^+-coupled anion transport systems.

5604 Other Environmental Pollutant Effects

33955 **(AD-A—178453/7/XAB) Fundamental studies in the molecular basis of laser-induced retinal damage. Annual report, 1 May 1985-30 April 1986.** Lewis, A. (Cornell Univ., Ithaca, NY (USA). Dept. of Applied and Engineering Physics). 31 Dec 1986. 35p. NTIS, PC A03/MF A01.

Progress on the fundamental effects of femtosecond laser pulses with retinal pigments, new insights into the detailed interactions of light with photoreceptor cells, and tremendous advances in new forms of super-resolution microscopy are discussed. The common Nd:YAG laser pumping a dye laser is used.

57 Health And Safety

REFER ALSO TO CITATION(S) 32621, 32623

58 GEOSCIENCES

5801 Geology And Hydrology

REFER ALSO TO CITATION(S) 32498, 32529, 32675, 32677, 32679, 33690, 33701, 33707, 33979, 33980, 33981, 33982, 33983, 33985

33956 (CONF-850442—Summs., pp 16) **Proposed deep drilling of the Wasatch normal fault zone, Utah.** Bruhn, R.L.; Smith, R.B.; Parry, W.T.; Chapman, D.S. Bowman, J.R.; Zoback, M.D. (Univ. of Utah, Salt Lake City). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

A deep drill hole into the Wasatch normal fault zone in northern Utah will provide fundamental data on crustal rheology, regional tectonics and earthquake generation along an active, extensional, intraplate boundary. The drill hole will provide the opportunity to measure the thermal, mechanical and chemical properties of 1) a Holocene normal fault zone capable of generating magnitude 7 to 7.5 earthquakes within a major urban corridor, and 2) the intraplate boundary between the Basin-Range and Rocky Mountain Province, which is marked by changes in crustal thickness, heat flow, seismicity, stress field and structure. The drill site should be located in either the Ogden, Salt Lake or Provo segments of the Wasatch fault zone based on considerations of regional structure, available seismic reflection data and earthquake risk. The hole should penetrate to depths between 5 and 10 km in order to sample the frictional/quasiplastic transition within the fault zone. Specific problems to be investigated include determining 1) the in situ stress state, 2) seismic reflectivity of the fault zone, 3) mineralogical and chemical composition of fault rock, 4) fault zone geometry, 5) fluid chemistry and pressure, 6) thermal and hydrological characteristics of the fault zone, 7) relation of the normal fault zone to older crustal structure. Downhole instrumentation will be required to monitor changes in stress, strain rate, fluid pressure and chemical properties in the fault zone. This data will provide direct evidence for the rheologic processes and geometric properties of contemporary crustal extension and earthquake generation.

33957 (CONF-850442—Summs., pp 18-20) **Proposal to drill in the Bay of Islands ophiolite complex, western Newfoundland.** Casey, J.F. (Univ. of Houston, TX). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

During the last two decades, the deep sea drilling program has played an essential role in accumulating data from the deep ocean basins that have allowed confirmation of many of the fundamental postulates of the theory of plate tectonics. Ironically, the proposed Continental Scientific Drilling Program in North America presents a unique opportunity by drilling within an on-land segment of intact oceanic crust and upper mantle, to achieve the initial goal of the oceanic drilling program, (i.e., to continuously core the oceanic crust and penetrate the oceanic Moho). The authors propose this drilling be conducted within the Bay of Islands Ophiolite Complex in western Newfoundland, Canada. Ophiolitic rocks in the Bay of Islands region consist of a discontinuous belt of mafic and ultramafic massifs approximately 100 km long and 25 km wide. Ophiolitic rocks represent the highest structural slices in the Humber Arm Allochthon emplaced in the middle to late Ordovician during the Taconic Orogeny in the northern Appalachians. Below the ophiolitic slices, the lower structural slices of the Allochthon consist of early Paleozoic seamount alkalic volcanic rocks, melanges, a flysch sequence, and continental rise and slope deposits. The allochthon, in turn, rests on an autochthonous flysch sequence, a stable margin carbonate shelf sequence, and a rift-related clastic sequence that unconformaly overlies Grenville basement. Transport of the Allochthon is estimated to exceed 100 km. The significance of the drilling is discussed.

33958 (CONF-850442—Summs., pp 22-24) **Significance of ultra-deep basement astroblemes.** 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

Drilling results may assist is determining the exogenic or endogenic origin of these circular uplifted basement areas and may provide better knowledge of the following: (1) The effect of basement astrobleme anomalies on geochemical emission profiles of crystalline rock overlain by sediments of Cambrian and younger age. This includes trace element concentrations. (2) Variations in the geothermal gradient within such structures and comparison with known endogenic crustal features. (3) The operation of interstitial fluid processes and mineralization in ultra-deep shock-fractured continental crust. (4) The role of astroblemes in subsiding basins. On a much larger scale, some impacts may initiate basin formation. (5) The presence of primordal methane and other gases. It is proposed that ultra-deep basement astroblemes be made an integral part of the research features for the Continental Scientific Drilling Program. If the suggested site proves to be unsuitable for continued study, then a search should begin for an appropriate location.

33959 (CONF-850442—Summs., pp 26-28) **Direct observation of very young igneous intrusions.** Eichelberger, J.C.; Miller, C.D.; Younker, L.W. (Sandia National Labs., Albuquerque, NM). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

Most large thermal regimes in the earth's crust are sustained by the convective transport of heat by magmas derived at deeper levels. Silicic magmas are of special interest because they accumulate at relatively shallow depths as plutons, thereby form a characteristic feature of continental crust. In addition, silicic magmatism is the cause of most of the explosive eruptive activity on the earth's surface. Outstanding problems in understanding this type of thermal regime are the mechanisms of upward migration of magma, the composition of magma and conditions during storage at shallow levels, and the processes of transfer of heat and mass from intrusions to associated hydrothermal systems and to the surface. Considerable progress has been made through geologic studies of active and eroded fossil volcanic systems, evaluation of geochemical and geophysical data concerning conditions at depth, and laboratory replication of inferred conditions. However, a number of critical questions can best be solved by direct observation; that is by drilling. These include the physical and chemical relationship of active volcanism to subsurface intrusion, the relative importance of conduction and convection in the cooling of intrusions, and the temperature and volatile content of melt at depth.

33960 (CONF-850442—Summs., pp 30-32) **Illinois superdeep drillhole: a comprehensive central US lithosphere study.** 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

A 30,000-foot superdeep hole in southern Illinois would provide new and vital scientific information for virtually every major category of geologic investigation on the continent. The site, in southern Gallatin or northern Hardin County, IL, is a tectonic and structural focal point critical for understanding both the Midcontinent Rift System and the development of the Illinois Basin and its deep, previously untested, sedimentary succession. Such a Midcontinent hole is necessary to gain further evidence of the incipient continental pull-apart and interior cratonic sag.

33961 (CONF-850442—Summs., pp 54-56) **Continental scientific drilling program basement test borehole in the Valley and Ridge of Tennessee.** Haase, C.S.; Dreier, R.B.; Jacobs, G.K.; Stow, S.H. (Oak Ridge National Lab., TN). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

Current CSDP plans allow for a deep borehole to be drilled in the Blue-Ridge-Piedmont region of the southeastern Appalachians. To enhance the interpretation of structural and stratigraphic data obtained from that project, the authors propose that an additional deep basement test borehole be drilled in the Valley and Ridge province of eastern Tennessee. A CSDP Valley and Ridge borehole would be located after detailed examination of available geological and geophysical data. The proposed borehole should be located reasonably close to the borehole that will be drilled into the crystalline terraine of the southern Appalachians. The borehole would be cored for its entire extent (borehole depth is estimated at approximately 7.5 km). A complete geophysical log package would be obtained for the entire borehole. Preliminary lithologic and stratigraphic logs would be prepared from the drill core immediately upon recovery and the core would be archived for future sampling and analysis. A complete investigative approach will be undertaken, including standard elemental and isotopic chemical analyses of rocks, waters, and dissolved gases and microscopic (petrographic, SEM, TEM) examinations. Plans also will be made to conduct long-term research projects within the borehole such as hydrologic monitoring and determination of in situ stress patterns. Analysis of the core, water samples geophysical logs, and other data obtained from the borehole would be undertaken by scientists from academic institutions, national laboratories, and other pertinent research institutions.

33962 (CONF-850442—Summs., pp 58-59) **Scientific drilling in the Manson, Iowa, structure.** Hartung, J.B. (Howard Univ., Washington, DC). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

Manson is the largest crater recognized in the US and the only one to involve granitic basement material on a large scale. Its age is known only to be younger than middle Cretaceous, based on the presence of poorly preserved fragments of fossils found in the fall-back breccia. The first objective of the proposed research is to learn what happens during an impact of this magnitude. This research would provide input to the broader problem of what the role of impacts is in the formation of the Earth's continental crust. Another objective which requires a drilling program is to learn the age of the Manson structure. The required depth of the drill holes is about 5000 ft (1500 m). Research activity using material from the drill core will include the following: logging of the drill core; petrographic study of the different distinct units recovered; geochemical analysis of impact melt rocks and country rock; argon 40-39 and Rb-Sr age measurements of impact melt rocks and country rock; and synthesis of data to establish the nature and chronology of

events; related to the formation of the Manson structure. Research work will be accomplished by a consortium of investigators from the Iowa Geological Survey, the US Geological Survey, and various university geology departments.

33963 (CONF-850442—Summs., pp 61) **Appalachian ultradeep drill hole: scientific objectives and goals of the site study.** Hatcher, R.D. Jr.; Williams, R.T.; Talwani, P.; Costain, J.K.; Glover, L.; Phinney, R.A.; Zoback, M.D.; Diebold, J.B.; Anderson, R.N. (Univ. of South Carolina, Columbia). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

The principal goal of drilling an ultradeep hole in the southern Appalachians is to test the hypothesis of thin-skinned thrusting of large sheets of crystalline rocks. Other goals of drilling this hole include study of the petrology of Grenville basement rocks, stratigraphy and deformation of platform cover beneath the thrust sheet, determination of the state of stress in the crust at seismogenic depths, development of logging and drilling technology in a deep hole in crystalline rocks, studies of the petrology and geochemistry of core, comparison of P-T conditions of metamorphism in similar assemblages in surface Blue Ridge exposures and core from 4-6 km, and opportunities to study both brittle and ductile fault rocks at several depths in both the Brevard fault zone and the master detachment. A long term goal of this project is for this area to become an International Laboratory for Geologic and Geophysical Studies of Orogenic Belts. The data to be gathered during the site study alone would make this one of the most intensively studied areas in the interior of an orogen. Drilling this hole will add an immense body of knowledge to the current knowledge of the anatomy of mountain chains and the evolution of continental crust.

33964 (CONF-850442—Summs., pp 63) **Deep drill hole on Central Basin platform of West Texas.** Hoover, J.D.; Hills, J.M.; Keller, G.R.; Roy, R.F. (Univ. of Texas, El Paso). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

Drilling has just been completed for a deep hole on the Central Basin platform of West Texas. This hole encountered basement at about 4600 ft and bottomed at 19,100 ft. Very preliminary analysis of samples from this well suggests that the igneous section drilled (approximately 14,500 ft) consisted almost entirely of a layered mafic intrusion. Downhole geophysical logs are in agreement with this interpretation and a vertical seismic profile type experiment indicates the average velocity of these igneous rocks is approximately 6.7 km/sec. A combination of air and mud drilling was employed and no cores were taken. However, several hundred pounds of hand-sized samples were recovered during drilling operations. Clearly a great deal can be learned from this hole, but it does appear that re-entry is feasible. Thus, further studies would be possible.

33965 (CONF-850442—Summs., pp 65-67) **Continental scientific drilling program. A proposal for deep scientific drilling and associated exploration and research, Texas Gulf Coast.** Land, L.S.; Galloway, W. (Univ. of Texas, Austin). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

The Texas and Louisiana Gulf Coastal provinces are characterized by an array of scientific dilemmas ranging from the origin of the Gulf itself and the nature of the subcrust to the causes and effects of long-lasting and continuing circulation of thermobaric waters throughout the thick sedimentary section. In the authors opinion, the San Marcos arch is the best location for investigating these important phenomena and problems. The arch, extending southeastward from exposed Grenville basement rocks of the Llano uplift, is situated in an area of both lateral and vertical convergence of the sedimentary cover of the Gulf Coast Basin. On the basis of their present understanding of deep structure, it appears possible to locate a drill hole southeast of the reef trend which will penetrate a thick sequence of abyssal sediments, sample sediments in an underlying rift, and enter the transitional crust beneath the sediments. Additional research leading to selection of the most propitious drill site would include use of the abundant shallow to intermediate depth (5000 m) drill data to refine the knowledge of fluid and diagenetic regimes of the upper part of the basin fill, analysis of the thermal regime and heat flow along the crustal transition zone, and expanded geochemical and isotopic studies to better define the extent and importance of vertical flux of fluids and elements through the sedimentary fill.

33966 (CONF-850442—Summs., pp 84-86) **Drilling target: Harney Peak Granite: exploration of the root zone of an S-type granite system.** Roggenthen, W.M.; Shearer, C.K.; Redden, J.A.; Papike, J.J. (South Dakota School of Mines and Technology, Rapid City). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

The authors propose to drill, sample, and log a target in a well-known, classic intrusive complex in order to gain insight into the vertical evolution of the magmatic system. The surficial geology of the area is well understood and credible models of the three-dimensional aspects of the granitic systems exist. These models are now testable given the state of drilling technology and are well within the capabilities of the CSDP program. It is appropriate that this target have a high priority because it may represent continental processes that shaped a significant portion of the Proterozoic continental crust.

33967 (CONF-850442—Summs., pp 88-89) **Investigation of active tectonic and magmatic process in Long Valley, via surface and borehole techniques.** Rundle, J.B. (Sandia National Labs., Albuquerque, NM). 1985. NTIS, PC A06/MF A01. File Number DE87001405. Contract AC04-76DP00789.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

Since October 1978, the Long Valley caldera has been rocked by a series of 7 M $\geqq$ 5.5 earthquakes, indicating a renewal of activity after about 40 years of quiescence. Coincident with the seismic activity, as much as .7 m of uplift has developed over the southern margin of the old resurgent dome, indicating renewed magmatic injection as well. And finally, extensive changes in the hydrothermal system indicate that the physical properties of the shallow crust are being altered as well. In order to gain a deeper understanding of the location and extent of magma within the caldera responsible for these changes, a group of scientists from Sandia, USGS, LBL, UCSB, USC, and the University of Wyoming, jointly initiated a plan to conduct a unified seismic imaging program across the central resurgent dome. The program revolved around use of a .9 km deep temperature gradient well (OLV-1) loaned to the author by Santa Fe Geothermal, Inc. The project was begun in July 1984 with a P-wave reflection profile through the northwest part of the caldera, and continues to the present with passive recording of earthquakes via telemetry by the University of Nevada-Reno. The authors have also proposed to use the well for measurements of in-situ stress and stress changes, as well as drilling two other wells in the south central portion of the caldera for the same purpose. These data are vital to understanding the rapid evolution of physical processes in this magmatically-driven system.

33968 (CONF-850442—Summs., pp 95-97) **Project upper crust: a program for shallow to intermediate depth scientific drilling and associated studies in the continental interior.** Van Schmus, W.R. (Univ. of Kansas, Lawrence). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

Principal needs in the midcontinent region are for (a) better lateral distribution of good samples of the crystalline basement, (b) detailed petrologic, geochemical, and geochronologic study of the Proterozoic crust, (c) geophysical measurements, and (d) regional stratigraphic analysis of the Phanerozoic cover. The authors recognize a three level approach to selecting drilling targets. First, they propose to maximize the lateral coverage needed by emphasizing drill hole with total depths of 1 to 2 km. Second, targets relating to vertical structure of the crust and petrogenesis, requiring penetra-

tion of 2 to 5 km, are an important aspect of a longer term drilling program in the continental interior. Third, there are some problems for which deeper drill holes (up to 10 km or more) will be essential. The latter two types can be developed as individual projects or delayed until a good data base is built up from shallower holes and detailed geophysical surveys.

33969 (CONF-850442—Summs., pp 99-101) **Ouachita folded belt, a site for deep continental drilling.** Viele, G.W. (Univ. of Missouri, Columbia). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

The two major areas of this folded Belt outcrop are in the Marathon uplift of western Texas and in the Ouachita Mountains of Arkansas and Oklahoma where the belt may be divided into several tectonic provinces. Of these the northernmost is the Arkoma Basin, a region in which Pennsylvanian clastic strata grade southward from shallow to deep water facies. These strata thicken abruptly across south-dipping, normal faults, which extend downward into the basement, and they are broken by slightly younger, northward-moving thrust faults. Lying farther to the south is the Ouachita thrust fault belt, a region of deep water deposits of flysch, broken and imbricated by numerous thrust faults and containing especially along its northern margin, structures and fabrics identical to those found in modern accretionary wedges. The deposits of flysch surround two uplifts, the Benton and Broken Bow, composed of multiply folded, lower and middle Paleozoic strata that were deposited in slope-rise and abyssal settings. The entire complex has been interpreted in terms of a complete Wilson cycle comprising an early rifting and spreading phase followed by a southward-subducting, closing and collision phase. A deep drill hole on the Benton uplift would be ideally situated to investigate a zone of continental accretion formed by subduction and collision. Specific questions to be addressed by deep drilling are discussed.

33970 (CONF-850442—Summs., pp 107-108) **Proposal for a technological and geological drilling experiment in the Minnesota River valley.** Walton, M.; Southwick, D.L.; Morey, G.B. (Minnesota Geological Survey, St. Paul). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

If the geologic research community is to accomplish continuous core drilling at acceptable costs and rates to depths of 5 to 10 or more kilometers, it has the obligation to work with industry to develop the required technology. Moreover, it has the further obligation to require demonstrated proof of deep-drilling capability under realistic geologic conditions before expensive, long-term commitments are made. The authors propose that this development be pursued in a hole approximately 5 km deep in Archean gneiss in the Minnesota River Valley. The hole would serve as a test for state-of-the-art drilling technology and would be designed to accommodate the newest developments in down-hole drilling motors and coring bits, core and motor retrieval systems, high-strength light-weight tapered rods, down-hole monitoring-while drilling instrumentation, etc., as well as conventional rotary core drilling systems. Drilling fluids, reaming and casing, rig design, automation, and the coupling of large oil-field type rigs to deep continuous core drilling systems are other areas where innovation and development are needed.

33971 (CONF-850442—Summs., pp 110-112) **Structure and tectonic history of California Coast Ranges - testing an obduction model of Franciscan emplacement inferred from seismic reflection profiles and other geophysical data.** Wentworth, C.M.; Barnes, I.; Blake, M.C. Jr.; Coleman, R.G.; Ernst, W.G.; Griscom, A.; Ingersoll, R.V.; Irwin, W.P.; Jachens, R.C.; Jones, R.J.; Kvenvolden, W.D. (Geological Survey, Menlo Park, CA). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

Structural relations between the Mesozoic Franciscan assemblage and Great Valley sequence have long been considered a type example of subductive accretion of trench and oceanic sediments against a continent. Surface relations indicate that Franciscan rocks of blueschist grade are thrust eastward beneath coeval, but unmetamorphosed, miogeoclinal strata of the Great Valley sequence along the Coast Range thrust, which is exposed for 600 km along the length of the eastern Coast Ranges. In the context of plate tectonics, this thrust has been assumed to continue eastward down into the mantle. In addition to testing the obduction model, the proposed drilling will provide subsurface information for a rich complement of ongoing Coast Range investigations. These include studies of: (1) structural relations at all scales, (2) petrology and isotopic ages of igneous and metamorphic rocks of the Franciscan assemblage, (3) stratigraphy, biostratigraphy, petrology, sedimentology, and organic thermal history of GVS and Franciscan rocks and their petroleum source-rock potential, (4) rock and fluid compositions and isotopic ratios in relation to diagenesis/metamorphism and production of high fluid pressures, (5) heat flow as a function of depth and evaluation of recency of wedge emplacement and degree of frictional heating, (6) physical rock properties such as seismic velocity, density, permeability, fractures, remnant magnetization, and magnetic susceptibility, (7) fluid pressure, and (8) in situ stress.

33972 (CONF-850442—Summs., pp 118-120) **Scientific drilling in the Sevier Desert Basin, Utah: in situ study of the interaction between high- and low-angle normal faults.** Zoback, M.L.; Thompson, G.A.; Zoback, M.D.; Smith, R.B. (Geological Survey, Menlo Park, CA). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

Currently available in situ stress measurements indicate that the state of stress near active faults is consistent with predictions of classic frictional faulting theory. The mechanical interaction between slip on steeply-dipping and low-angle normal faults, both of which are observed geologically in the Basin and Range province, remains unexplained by this theory. For example, recent industry and COCORP seismic reflection data from central Utah reveal a regionally extensive low-angle detachment fault into which steeply-dipping normal faults with known Quaternary movement can be seen to merge, without offsetting the detachment fault. The proposed target area is in the western part of the Sevier Desert Basin, Utah where, based on reflection data, it should be possible to drill through a high-angle normal fault and then intersect the detachment at a depth of less than 6 km. The rocks above and below the detachment in this area are probably well-indurated Paleozoic sediments which would be ideal for down-hole measurements. The objectives of the proposed hole would be to determine the conditions of the in situ stress field, temperature, values of frictional coefficients and composition of the respective fault zones, and magnitudes of the in situ pore pressure that could explain the observed fault interaction. The location is especially favorable because of Quaternary faulting activity and an abundance of subsurface data, including petroleum exploration wells and several hundred kilometers of seismic reflection data.

33973 (DOE/BP—733) **US Environmental Protection Agency River Reach File: Hydrologic segment plots, Oregon.** (USDOE Bonneville Power Administration, Portland, OR. Div. of Power Resources Planning). Mar 1987. 76p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE87009950.

The report contains maps illustrating the hydrologic subdivisions of rivers in Oregon. (ACR)

33974 (DOE/BP—734) **US Environmental Protection Agency River Reach File: Hydrologic segment plots, Washington.** (USDOE Bonneville Power Administration, Portland, OR. Div. of Power Resources Planning). Mar 1987. 66p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87009949.

The report contains maps showing the hydrologic subdivisions of rivers in Washington. (ACR)

33975 (DOE/BP—735) **US Environmental Protection Agency River Reach File: Hydrologic segment plots, Idaho.** (USDOE Bonneville Power Administration, Portland, OR. Div. of Power Resources Planning). Mar 1987. 73p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87009951.

The report contains maps illustrating the hydrologic subdivisions of rivers in Idaho. (ACR)

33976 **(DOE/BP—736) US Environmental Protection Agency River Reach File: Hydrologic segment plots, Montana.** (USDOE Bonneville Power Administration, Portland, OR. Div. of Power Resources Planning). Mar 1987. 106p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE87009952.

The report contains maps illustrating the hydrologic subdivisions of rivers in Montana. (ACR)

33977 **(DOE/ER/40048—193) Ion source sample preparation techniques for carbon-14 AMS measurements.** Balsley, D.R.; Farwell, G.W.; Grootes, P.M.; Schmidt, F.H. (Washington Univ., Seattle (USA)). 1987. Contract AC06-81ER40048. 13p. (CONF-8704112—4). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009709.

From 4. international symposium on accelerator mass spectrometry; Ontario, Canada (27 Apr 1987).

Methods for preparing solid graphite, and other types of carbon samples possessing good geometrical characteristics and producing large beams are described. Amorphous carbon, or graphite powder, is encapsulated in tantalum, compressed to ~14 kilobars, and heated in vacuum to ~2500°C. The end of the capsule is cut off, exposing a smooth and hard graphite surface which provides excellent emittance in a reflection-type sputter source. The powder is prepared from CO_2 by the hydrogen-iron powder catalyzation method. Silver-carbon mixtures with good geometrical properties can also be prepared with our press. 6 refs., 4 figs.

33978 **(ORNL/TM—10000) Subsurface data base for Bear Creek Valley, Chestnut Ridge, and parts of Bethel Valley on the US Department of Energy Oak Ridge Reservation.** Haase, C.S.; Gillis, G.A.; King, H.L. (Oak Ridge National Lab., TN (USA)). Apr 1987. Contract AC05-84OR21400. 178p. NTIS, PC A09. File Number DE87009109.

Construction data and available hydrogeological data for 582 boreholes and wells at the Y-12 Plant and in the surrounding vicinity have been assembled and tabulated in a data base. General data about boreholes and wells included in the data base are survey coordinates, elevations, and alternative names. Construction data tabulated include total depth, completion method, borehole diameter, casing and screen materials, filter pack depths, open-hole intervals, and open hole diameters. Hydrogeological data summarized includes depth to weathered and fresh bedrock, formations penetrated, and whether rock core and geophysical logs were obtained. The tabulations provide a means of determining the amount and quality of data available for a particular borehole or well. Applications of the data tabulations include evaluation of the suitability of wells for continued use in groundwater investigations and monitoring studies, site hydrogeological characterization activities, background evaluations of sites prior to initiation of new drilling activities, and geohydrologic review of selected sites prior to the initiation of remedial actions. 8 refs., 1 fig.

5802 Geophysics

REFER ALSO TO CITATION(S) 32676, 32678, 32678, 32680, 32875, 33752, 33956, 33957, 33959, 33963, 33965, 33969, 33971, 33972

33979 (CONF-850442—Summs., pp 47-49) **Continental scientific drilling program Southern Oklahoma Aulacogen.** Gilbert, M.C.; Denison, R.E.; Keller, G.R.; Mankin, C.J.; Wickham, J.S. (Texas A & M Univ., College Station). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

The Southern Oklahoma Aulacogen has been considered by many as the North American type of this structural class. This feature apparently developed during the late Proterozoic-early Cambrian rifting of the continental margin. It is representative, as well as the best exposed, of a series of rifts along the southern and eastern margin of the North American plate during this time period. Pronounced Pennsylvanian structural inversion has lifted the igneous basal sections of this rift to shallow crustal levels and exposed parts of it. The following discussion lays out a rationale for the commitment of a scientific drilling program within this inverted, structurally high but stratigraphically deep, zone of the continental crust.

33980 (CONF-850442—Summs., pp 69-71) **Deep drilling near Parkfield, California to investigate thermomechanical processes leading to a magnitude 6 earthquake.** McGarr, A. (Geological Survey, Menlo Park, CA). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

This abstract summarizes a proposed scientific program prepared by a group of 22 investigators. The forecast of a magnitude 6 earthquake to occur in 1988 (+/-5 years) near Parkfield, CA, and the characteristic nature of similar events, which have had typical interval times of 21-22 years since 1857, provide a unique opportunity to improve the authors understanding, by means of in situ measurements at depth, of (1) the nature of the processes responsible for medium-sized earthquakes, (2) the detectability of changes in fault zone properties before such events, (3) coseismic changes in the crustal state within and adjacent to the fault zone, and, finally, (4) the general thermomechanical nature of the forces causing interplate motion. For each hole the authors propose to make measurements to determine the crustal state and material properties within or adjacent to the fault zone during the course of drilling including stress, fluid pressure, porosity, temperature, fluid and rock composition, permeability, density, magnetic susceptibility, remnants magnetization, and seismic velocity. Measurements would be repeated, as appropriate, after the next Parkfield earthquake. Finally, the authors wish to monitor continuously temperature and pore pressure in the bottom portions of the holes within or immediately adjacent to the fault zone.

33981 (CONF-850442—Summs., pp 73-75) **Recent geological & geophysical investigations in the southern Appalachians and their relation to drillsites for the Continental Scientific Drilling Program.** Nelson, A.E.; Horton, J.W. Jr.; Wynn, J.C.; Clarke, J.W. (Geological Survey, Reston, VA). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

Westerly transported thrust sheets have been known for many years to be the dominant structural feature in the Valley and Ridge province of the southern Appalachian orogen. Recent work has shown that the same structural style dominates much of the crystalline terrane east of the Valley and Ridge as well. Distinct rock assemblages compose each of these thrust sheets, and each sheet probably contains rocks formed in a different depositional environment. Gravity data with approximately 1-km-spacing are available for a distance of 25 km on either side of the COCORP line, and Geotronix Corp. magnetotelluric data have been acquired along the COCORP line as well. If a Continental Scientific Drilling Program drillsite were chosen near to the COCORP line, this geophysical data could be used in drillsite selection and later interpretations. Geologic considerations also suggest several drillsite options. This paper then presents options on the location of these drillsites based on the thrust sheets which each would provide information on.

33982 (CONF-850442—Summs., pp 77-78) **Middleton Island, Gulf of Alaska: a possible site for deep drilling into an active subduction zone.** Plafker, G.; Page, R.A. (Geological Survey, Menlo Park, CA). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

The authors propose that Middleton Island, near the eastern end of the Aleutian arc, be investigated as a candidate site for deep drilling to examine processes and physical conditions within an active subduction zone. A broad range of problems could be addressed with a deep hole beneath Middleton Island, among which are the level of pore fluid pressure in the subduction zone and the role of pore pressure in faulting and subduction, the state of stress in the vicinity of the megathrust and in the overlying plate, and

constitutive properties of materials in the megathrust. Sampling within the subduction zone would document the physical and chemical alteration of marine sediments subducted about 1 million years ago. A deep hole would also provide a quiet observatory for monitoring seismicity and acoustic emissions in the vicinity of the megathrust as well as changes of pore pressure, strain, fluid chemistry and temperature during the earthquake cycle.

33983 (CONF-850442—Summs., pp 80-82) **Scientific drilling in the Cascades volcanic arc.** Priest, G.R.; Blackwell, D.D. (Oregon Dept. of Geology and Mineral Industries, Portland). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

The Cascades volcanic arc is of world-wide significance. It represents a unique end member in the spectrum of subduction-related volcanic arcs. Cascade volcanism is related to slow subduction of a small, young oceanic plate beneath a major continental plate. Development of a comprehensive geologic model for the evolution and dynamic processes operative in the arc will provide a general predictive model when combined with data from continental volcanic arcs related to rapid subduction of old oceanic lithosphere. The great size of the active portion of the arc, over 1300 km in length and 40 to 60 km in width, probable high potential for geothermal resources, and record of violent volcanic eruptions underscore the importance to the nation of understanding the Cascades. Additional detailed surface and subsurface studies are needed to quantify the geologic evolution and rates of mass and energy transfer in the arc. The studies should be focused on representative east-west transects where there is access to drill and a large data base. The following four areas have been proposed: Mount St. Helens-Mount Adams in the southern Washington Cascades, the Willamette Pass and Santiam Pass in the central Oregon Cascades, and the Mount Shasta-Medicine Lake area of Northern California (Priest and Blackwell, 1984).

33984 (CONF-850442—Summs., pp 91-93) **Crustal drilling experiment near the southern margin of the Colorado Plateau and in the San Francisco volcanic field.** Sass, J.H. (California Institute of Technology, Pasadena). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

The USGS recently initiated the Pacific to Arizona Crustal Experiment (PACE), involving geologic and geophysical studies along a transect from coastal southern California to west-central Arizona, reaching the Colorado Plateau south and east of Flagstaff. COCORP has scheduled a vibroseis reflection profile along the Arizona portion of the transect. Heat flow and stress direction studies in shallow (100-200 m) wells are planned for the Mojave-Sonoran segments of the profile. To anchor the eastern edge of the transect by such studies, and to obtain data pertinent to the stresses and thermal relationships suitable drill holes will be needed. The authors propose to drill two continuously cored holes to depths of 2-2.5 km. Apart from studies of the coupled thermal, hydrologic, tectonic and geodynamic processes, the continuous core from these sites will allow detailed studies of the physical properties as well as the geochemistry and petrology of the entire geologic section.

33985 (CONF-850442—Summs., pp 114-116) **Scientific drilling and experimentation at Cajon Pass, a site near the San Andreas fault in southern California.** Zoback, M.D. (Stanford Univ., CA). 1985. NTIS, PC A06/MF A01. File Number DE87001405.

From Reservoir characterization technical conference; Houston, TX, USA (29 Apr 1985).

This is a proposal for deepening a 2-km deep well at Cajun Pass, California to a depth of 5 km, conducting extensive downhole measurements and core analyses, and utilizing the hole after drilling as an ultraquiet seismic and strain observatory. The Cajon Pass site is located 4 km from the San Andreas fault, in the eastern Transverse Ranges. One of the primary objectives of this proposal is to attempt to resolve the 15-year old debate concerning the level of shear stresses on the San Andreas fault. A number of intriguing geological questions will also be addressed through deepening this well. For example, geological mapping, seismic studies, and regional gravity data suggest that low-angle thrust and/or detachment faults may underlay the eastern Transverse Ranges at relatively shallow depth. Such a hypothesis might be tested by deepening this well. Interestingly, such low-angle detachments are predicted by one thermo-mechanical model for low heat flow on the main fault trace. In this model, the low-angle detachments would be the principle sources of resistance to plate boundary motion. The core exhumed from the well will also make possible a wide range of petrologic, petrophysical, and geochemical studies.

33986 (CONF-8510249—Vol.2, pp 791-798) **Airborne video thermal infrared: detection of geothermal areas on Mount St. Helens, Washington.** Clement, W.V. (Army Engineer District, Portland, OR). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

A video output, uncalibrated video imaging system was utilized to map residual heat from the 1980 volcanic eruptions of Mount St. Helens in Washington State. Aerial vertical images were collected, rectified, mosaicked, and correlated with surface and subsurface temperatures measured on the debris avalanche. The imagery was subjected to a variety of image processing techniques such as a histogram stretch, spatial filtering, and level slicing. An isothermal map of a portion of the debris avalanche was generated for subsequent use in hydrologic analyses. 8 references, 2 figures, 1 table.

33987 (SAND—87-0921C) **A prototype radar fracture mapping system.** Chang, Hsi-Tien. (Sandia National Labs., Albuquerque, NM (USA)). 1987. Contract AC04-76DP00789. 6p. (CONF-8704110—8). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010036.

From 5. geothermal program review; Washington, DC, USA (14 Apr 1987).

The design and fabrication of a prototype radar system for fracture detection have been completed. This system uses directional antennas for both the transmitter and the receiver in a single tool which provides both the distance and the direction of a fracture in a downhole application. Electronic circuits in the system generate 50 kW peak power impulse with -100 dbm minimum detectable sensitivity. Unique downhole sampling and uphole data reconstruction techniques are used to obtain high frequency data using standard logging cable. In a recent test conducted in a lake, radar returns from a target were clearly observed. Problems encountered in the prototype and the future test plans are discussed.

5803 Mineralogy, Petrology, And Rock Mechanics

REFER ALSO TO CITATION(S) 32470, 32504, 34451

33988 (CONF-8510249—Vol.2, pp 617-618) **Computer-aided drainage network analysis from Landsat imagery and its application to rock type recognition.** Wang, J.F.; Shi, S.M.; Zhang, X.D. (Peking Univ., Beijing, China). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

In the present study, a new method for the recognition of rock types from remote sensing data has been developed. It is based on computer analysis of drainage network patterns interpreted from Landsat imagery. The area of study was part of Shanxi Province, China. Drainage network maps were visually interpreted and traced from 1:250,000 scale color composite prints of Landsat images. Further drainage analysis was done entirely by computer. Fifteen structural features have been computed and used in the rock type classification. The areas selected presented three rock types: carbonate rock, clastic rock and loess.

33989 (CONF-8510249—Vol.2, pp 631-632) **Discrimination of altered and unaltered basaltic rocks in southwestern U.S. by Landsat Thematic Mapper data-analysis.** Berlin, G.L.; Chavez, P.S. Jr.; Davis, P.A. Jr. (Geological Survey, Flagstaff, AZ). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

Digital analysis of Landsat-4 Thematic Mapper (TM) data has been used to discriminate unambiguously basalt vents or cones from their associated basalt flows and surrounding sedimentary country rock. This study concentrated on three sparsely-vegetated Cenozoic volcanic fields in the southwestern US: (1) the Greenwater Range volcanics in eastern California; (2) the Crater Flat volcanics in southern Nevada; and (3) the San Francisco volcanics in northern Arizona. Statistical analysis methods were used to determine the amount and distribution of information contained in each of the six non-thermal TM data sets for each of the three study areas. One of the methods, called the Optimum Index Factor (OIF), was used to rank the 20 possible three-band combinations that can be made from the six non-thermal TM image bands. The OIF value for any subset of three bands is based on the sum of their standard deviations normalized by the sum of the absolute value of their correlation coefficients. The combination having the largest OIF value should have the most information (total variance) with the least amount of duplication. The OIF rankings show that (1) three-band combinations that include one of the visible bands (TM 1, 2, or 3) with the near-infrared band (TM 4) and one of the middle infrared bands (TM 5 or 7) give high OIF rankings, and (2) OIF combinations using contiguous bands usually rank low because the bands are more highly correlated. Three-band color composite images of the three study areas corroborate the statistical results.

33990 **(DOE/ER/13607—1) On the undrained response of fluid-saturated fissured rock.** Lehner, F.; Kachanov, M. (Tufts Univ., Medford, MA (USA)). Apr 1987. Contract FG02-86ER13607. 10p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87008432.

A classical Biot theory of the time-dependent response of fluid-saturated media was formulated for the porous material, with the microstructure formed by small pores interconnected by narrow channels. The stress-strain relations for such media are isotropic. In addition to pores, rock materials often contain a network of narrow, crack-like fissures. Since the deformational response of a fissure to the external load depends on its orientation with respect to the load, the undrained ("instantaneous") fluid pressures will be different in fissures of different orientations ("pressure polarization"). Therefore, stress interactions between cracks will be coupled with fluid pressures in crack cavities. These coupling phenomena are considered on the basis of the recently developed method of analysis of many cracks problems. This method is modified to account for the presence of compressible fluid in cracks.

33991 **Petrography, geochemistry, and tectonic significance of the amphibolites of the Alabama Piedmont.** Stow, S.H.; Neilson, M.J.; Neathery, T.L. (Oak Ridge National Lab., TN). *American Journal of Science;* **284**: No. 4-5, 414-436(Apr-May 1984). Contract W-7405-ENG-26.

The Alabama Piedmont contains amphibolites in three structurally distinct tectonic blocks. In the Northern Piedmont, north of the Breavard zone, the Mitchell Dam, Ketchepedrakee, and Beaver Dam Amphibolites occur intercalated with metasedimentary rocks. In the Inner Piedmont block, south of the Breavard zone, the Doss Mountain, Ropes Creek, Waresville, and Zebulon amphibolitic units occur. In the Uchee block of the southern Piedmont, south of the Towaliga Fault zone, the Hudson Rapids Amphibolite occurs. All amphibolites are interpreted to be of metaigneous origin based upon Niggli trends, presence of relic pyroxene, general geochemical character, and spatial relationship to igneous rocks. The protoliths of the amphibolites were tholeiitic basalts based upon normative mineralogy and chemical distinctions such as alkali-SiO_2, AFM, and the Y/Nb ratio. REE patterns are flat with slight LREE enrichment. All the amphibolites are geochemically similar except for the Doss Mountain Amphibolite, which has exceptionally low alkali, TiO_2, REE, and incompatible element constants. Except for the Doss Mountain Amphibolite, the parental basalts represent an oceanic rifting environment; an E-MORB tectonic character is suggested. The Doss Mountain parental basalt, however, represents arc activity.

5804 Geochemistry

REFER ALSO TO CITATION(S) 33747, 33958, 33960

33992 (CONF-8510249—Vol.2, pp 619-620) **Field analysis of AIS imagery over late-stage hydrothermal alteration of the Ann Mason porphyry copper deposit, Yerington, NV.** Lyon, R.J.P.; Yamaguchi, Y. (Stanford Univ., CA). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

Five flight lines of the 128-channel AIS scanner (1.2-2.4 μm) were flown 28 July 1984 along pre-selected directions over the late-stage Younger hydrothermal alteration at the Ann Mason porphyry copper deposit. The lines in the WNW-ESE direction were flown up the plumbing of the porphyry system, which here has been tilted 70 degrees west, exposing almost 6 km of continuous outcrop. The ESE base is albitized granodiorite (Jgd) proceeding WNW (upwards) through the porphyritic dikes (Jqmp) to where the Early-Tertiary erosion surface truncates the system about 2 km short of its original comagmatic volcanics. Their pre-processing software, running on an IBM/XT Personal Computer imaging system, enables atmospheric effects to be almost eliminated, using the Australian concept of Log-Residuals leaving the spectral color as the corrected image to be displayed and field analyzed. Several hundred ground spectral measurements have been made, using both the Collins GER unit and the newer Carr-Boyd unit with excellent comparisons with the AIS (and TMS) imaged data sets. Cross-correlations will be illustrated. Discussion will also cover the field needs for spectrometers, relating their FOV to the sampling problems of the real world of geologic mapping.

33993 (CONF-8510249—Vol.2, pp 621-630) **Study of the geological structures of the Andhra coast India using Landsat MSS imagery and their significance to oil and mineral occurrences.** Gupta, A.K.; Rao, V.R. (Indian Space Research Organization Headquarters, Bangalore). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

Imprints of the quaternary regression are well marked along the Indian Coast. They occur as strandlines and cheniers. These features are very prominent along Krishna-Godavari River Basin (K-G Basin) in the east coast of India and occur as the main topographic/relief features in the delta plain. A case study has been carried out to study the significance of Landsat Satellite imagery derived geological information in the oil and mineral exploration in K-G Basin and the coastal areas of the Prakasham, Guntur and Ongole districts of the State of Andhra Pradesh. Visual interpretation of multidate False Color Composites (FCCs) have been carried out and structural maps prepared. The details have been correlated with the topographic, gravity and magnetic anomaly, tectonic, oil and the mineral maps of the study area. The study has brought out additional information and highlighted potential oil and mineral bearing areas. An assessment has also been made of the steps involved with remote sensing, for quick information generation. 10 references, 5 figures, 3 tables.

33994 (CONF-8510249—Vol.2, pp 875-884) **Monitoring federally owned minerals via Landsat.** Arndt, R.E.; Feagan, T.R.; Bonner, W.J. Jr. (Dept. of the Interior). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

The Bureau of Land Management's Eastern States Office has management responsibility for approximately 40 million acres of federally owned minerals located in 31 eastern States. Significant reserves of coal, phosphates, and other valuable minerals exist as part of this estate. These resources net millions of dollars in royalties for the Federal treasury. In recent years the unauthorized removal of some of these minerals has been discovered. In Alabama nearly 600,000 short tons of coal valued at approximately 10 million dollars were removed from federally owned lands between 1974 and 1981. An investigation revealed that the primary cause for this problem was the inadequate oversight of this large mineral estate

due to the lack of sufficient field personnel and a reliable means of monitoring these lands. In response the Bureau of Land Management evaluated the utility of Landsat-assisted change detection procedures. The Landsat albedo difference algorithm together with Landsat Multispectral Scanner digital data were tested in Alabama coal and Florida phosphate mining areas. These efforts proved successful, and a monitoring program, which included a spatial data base, was implemented in the high priority areas of the eastern US. 4 references, 6 figures.

33995 **(GJBX—1(85)-Vol.12) NURE HSSR [National Uranium Resource Evaluation - Hydrogeochemical and Stream Sediment Reconnaissance] Quadrangle Summary Tables: Alaska, Volume 12.** (Oklahoma Univ., Norman (USA). Energy Resources Inst.). 4 Jun 1985. Contract AC07-82GJ01706. 459p. NTIS, PC A20. File Number DE85014028.

This volume presents a summary of the distribution of elemental concentrations for water and sediment samples across quadrangles located in the Alaska North/Alaska South Regional File. The next section briefly outlines the approach used by ISP in preparing these data tables. This is followed by an Alphabetical Index to the quadrangles contained in the Alaska North/Alaska South Regional File and a Quadrangle Map; both the Index and Map present a record count for each quadrangle. The last section presents the data summary tables organized by sample type (water or sediments) and displaying elements within quads and quads within elements. These data summary tables show the general ranges of values present in the NURE Hydrogeochemical and Stream Sediment Reconnaissance sample data in each quadrangle or state. As with all summaries, they represent the data according to the best judgement of the professionals doing the analysis. This section gives a general description of the procedures used to produce the quadrangle summary percentiles that follow. The analytical methods used in the NURE program, like all methods of trace-element analysis, are applicable only where the element is present in concentrations greater than some lower limit. The lower limits vary from one element to another and also with the overall composition of the samples (the so-called 'matrix effect'). Elements with concentrations in a given sample below the detection limit of the appropriate analytic technique are designated as 'below detection' observations in the following tables and charts. These 'below detection' values are identified on the NURE HSSR files by negative entries in the concentration fields and are sometimes called negative concentrations. In order to present a statistical summary of data for elemental concentrations, a percentile distribution of the observations is desirable.

33996 **Chronologies of sedimentary processes in sediments of the foam site, Long Island Sound, Connecticut.** Krishnaswami, S.; Monaghan, M.C.; Westrich, J.T.; Bennett, J.T.; Turekian, K.K. (Yale Univ., New Haven, CT). *American Journal of Science;* **284**: No. 6, 706-733(Jun 1984). Contract AC02-76EV13573.

A detailed study of the sedimentation and diagenetic history of diver-taken sediment cores from the FOAM site in Long Island Sound was made by determining the distribution with depth of the following properties: ^{234}Th/sub XS/, ^{7}Be, ^{210}Pb/sub XS/, /sup 239,240/Pu, selected trace elements, ^{14}C (in both shells and organic fraction), pore water sulfate, and the diagenetic reaction products, solid phase organic carbon and sulfur. The ^{234}Th/sub XS/ and ^{7}Be data indicate that the upper 4 cm are well mixed on the time scale of about a year. The distributions of ^{210}Pb/sub XS/, /sup 239,240/Pu, and anthropogenic trace metal excesses in the (4-15) cm section are controlled by the mixing of the surface (0-4) cm sediment into this layer. The net sediment accumulation rate in the (0-15) cm layer is about 0.03 cm/yr. The average sediment accumulation rate in the (~ 18-100) cm layer, as determined from ^{14}C ages of shell layers, is 0.094 +/- 0.021 cm/yr, perhaps a factor of ~ 2 lower than that estimated from diagenetic modelling of solid phase sulfur and organic carbon depth profiles. The sediment structure indicates that the sediment accumulation in this depth zone has been episodic with the possibility of erosion as well as deposition having occurred. Their study shows that in high energy and dynamic sedimentary environments, such as the FOAM site, the results of steady state diagenetic modelling should be accepted only over time and depth scales permitted by the physical evidence.

5805 Oceanography

REFER ALSO TO CITATION(S) 33732, 33733, 33738, 33747

33997 (CONF-8510249—Vol.2, pp 865-874) **Optimization of multispectral sensors for bathymetry applications.** Tanis, F.J.; Byrnes, H.J. (Institute of Michigan, Ann Arbor). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

The utility of airborne and space multispectral scanner (MSS) data to assess coastal bathymetry has been demonstrated in several studies conducted over nearly a decade. The ultimate objective of this research has been to develop a more practical alternative to standard sonar surveying methods which have been long recognized to be slow and expensive. The Naval Oceanographic office has proposed to augment their current capabilities with an airborne MSS system capable of conducting hydrographic survey of shallow and clear oceanic waters for purposes of determining ocean depth and identifying marine hazards. This system is envisioned to substantially reduce surveying times and provide a surveying capability in shallow waters restricted to conventional survey sounding boats. Recent efforts have concentrated on development of an active passive system where the active system will be used to calibrate a passive multispectral sensor. Major issues which surround the development of this system include desirable scanner characteristics, data retrival and reduction, and suitable processing depth extraction algorithms. In this paper parameters which influence collection system design and depth extraction techniques have been used to describe the some practical bounds to which MSS technology can support coastal bathymetric surveying. Performance is estimated in terms of expected signal to noise ratios and depth extraction errors. 12 references, 3 figures, 1 table.

33998 (CONF-8510249—Vol.2, pp 991-998) **Use of satellite observations of ocean color in commercial fishing operations.** Wittenberg-Fay, R.E. (National Oceanic and Atmospheric Administration, La Jolla, CA). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

Commercial fishermen are interested in the safety of their crews, boats and gear, and in taking the best catch for their time and money. Rising fuel costs, increased competition from foreign fisheries, improved knowledge about fish habits and the new 200-mile economic zone have all had an impact on the US fishing industry. As a result, the modern fisherman, now requires reliable and timely information about the marine environment in order to operate most efficiently. This paper describes an experimental program sponsored by the NOAA/National Ocean Service designed to help meet this need, which involves the preparation and distribution of satellite derived fisheries-aid charts. Included in this set of ocean observations are charts depicting ocean color structure off the West Coast of the US, which are part of daily radio facsimile broadcasts to commercial fishermen. Results to date have shown that improved safety at sea and decreased fuel costs can be achieved through the use of these special fisheries charts. 8 references, 3 figures.

33999 (CONF-8510249—Vol.2, pp 999-1012) **Calibration of dual-frequency SAR ocean imagery.** Kasischke, E.S.; Larson, R.W.; Lyzenga, D.R. (Environmental Research Institute of Michigan, Ann Arbor). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

A calibration procedure for digital aircraft SAR imagery is presented. Techniques to utilize internal and external calibration references are discussed. Examples of calibrated intensity scans from an oceanographic test site are presented. The relationship of the aircraft SAR calibration procedure to future spaceborne SAR systems is discussed. 17 references, 10 figures, 1 table.

34000 (CONF-8510249—Vol.2, pp 1013-1014) **Evaluation of image enhancement techniques on SAR ocean imagery.** Kasischke, E.S.; Clinthorne, J.C.; Wackerman, C.C. (Environmental Research Institute of Michigan, Ann Arbor). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

A wide variety of oceanic and man-made processes result in surface patterns which can be detected on SAR imagery. Among these patterns are those associated with gravity waves, internal waves, tidal currents, frontal boundaries, ship-generated wakes, meteorological events, oil spills, sea ice and bottom features. The strength of these patterns is dependent on several environmental parameters, including air/sea temperature, wind speed and direction and the strength of the oceanic process causing the patterns. Because bathymetric features can be detected via a hydrodynamic interaction between the ocean bottom and a physical ocean process, the US Defense Mapping Agency is presently planning to use imagery from spaceborne SAR systems as an aid to detect hazards to navigation. Prior to supplying the SAR imagery to the hydrographers, a standardized set of post-image formation, image enhancement algorithms will be applied to the data. The purpose of this paper is to describe an effort to evaluate the effects of various image enhancement algorithms on SAR imagery which contains bottom feature information. The SAR image enhancement techniques that have been evaluated are speckle reduction and edge enhancement.

34001 (CONF-8510249—Vol.2, pp 1015-1034) **Temporal and spatial analyses of civil marine satellite requirements.** Hooper, N.J. (Metrics, Inc., Atlanta, GA). 1985. NTIS, PC A24/MF A01. File Number DE87006269.

From 19. international symposium on remote sensing of environment; Ann Arbor, MI, USA (21 Oct 1985).

In mid-1989, two similar oceanic measuring satellite systems are planned for launch. Both systems are designed to provide oceanic data and information, but the instrumentation approaches are different. Civil users within the US will be able to participate in either of these two satellite programs only by means of a proposed National Oceanic and Atmospheric Administration (NOAA)-led activity. This paper reports on data analysis conducted in support of that activity in order to show the advantage of having a synthesis of data from both satellite systems which would be greater than data from either system separately. The results of this analysis indicate that the combination of sensors would satisfy 70% of the marine users of surface wind data and products, the highest priority ocean parameter. 20 figures, 1 table.

34002 **Interaction of estuarine and shelf waters: A model and applications.** Zhang, Q.H.; Janowitz, G.S.; Pietrafesa, L.J. (Department of Marine, Earth and Atmospheric Sciences, North Carolina State University, Raleigh, North Carolina 27695-8208). *Journal of Physical Oceanography;* **17**: No. 4, 455-469(Apr 1987).

An analytical model is developed to describe the steady flow in an estuary—self interaction region where the system is treated as a two layer density stratified flow. The motion is expanded in terms of the relative thickness of the vertical Ekman layer. The zero-order flow is geostrophic in each layer. Balancing of order-one quantities reduces the system to two vorticity equations relating the pressure field with the displacement of the interface and the bottom topography. An explicit solution is obtained for the case of linear offshore sloping bottom. The flow behavior of the estuarine plume depends on the vertical structure of the flow at the river mouth, the bottom slope and the ambient coastal flow. Under certain conditions, a front exists as an offshore boundary of the plume. These results are compared with observations for the Changjiang River Estuary (in China), and both the Chesapeake Bay and Savannah River estuaries in the United States.

34003 **Auger spectroscopy analysis of magnesian calcite overgrowths precipitated from seawater and solutions of similar composition.** Mucci, A.; Morse, J.W.; Kaminsky, M.S. (Texas A & M Univ., College Station). *American Journal of Science;* **285**: No. 4, 289-305(Apr 1985). Contract W-31-109-ENG-38.

Novel procedures were developed to determine the composition of magnesian calcite overgrowths precipitated on calcite crystals from seawater solutions. A surface sensitive analytical technique, Scanning Auger Microanalysis (SAM), was used to determine the composition of very thin overgrowths (< 0.5 μm) which could not be analyzed by more conventional techniques. Thin magnesian calcite overgrowths were precipitated by exposing Iceland spar calcite crystals to slightly supersaturated (Omega similarly ordered 1.2) synthetic seawater solutions of various Mg to Ca ratios, at 25°C, for various lengths of time. The SAM analysis of these thin overgrowths (30-300 A) reveals that their composition is identical to the composition of much thicker overgrowths ($\approx$ 4000 A) which were precipitated from highly supersaturated solutions ($3 \leqq$ Omega $\leqq 17$) on reagent grade calcite powder. These results strongly suggest that the magnesian calcite overgrowth is in exchange equilibrium with the solution from which it precipitates and that it is representative of the solubility controlling phase. A magnesian calcite overgrowth containing 8 +/- 1 mol percent magnesium carbonate will precipitate from standard composition seawater ($[Mg^{2+}]/[Ca^{2+}] = 5.13$) under their experimental conditions. The SAM analysis of the surface-most adsorbed layer ($\approx$ 10 A) on the overgrowths precipitated from seawater solutions of various magnesium-to-calcium concentration ratios reveals that the magnesium-to-calcium concentration ratio in the surface-most region follows a typical Langmuir adsorption isotherm profile. Since it appears that the composition of the surface-most adsorbed layer of a magnesian calcite does not play an active role in determining the composition of the precipitating solid, they speculate that the adsorbed layers on the overgrowth may be viewed as a porous region within which the growth process takes place.

64 PHYSICS I

6401 Astrophysics And Cosmology

REFER ALSO TO CITATION(S) 34091, 34106, 34112

34004 **(CONF-8602110—1) The ir emission features: Emission from PAH [Polycyclic Aromatic Hydrocarbons] molecules and amorphous carbon particles.** Allamandola, L.J.; Tielens, A.G.G.M.; Barker, J.R. (National Aeronautics and Space Administration, Moffett Field, CA (USA). Ames Research Center; Michigan Univ., Ann Arbor (USA). Dept. of Atmospheric and Oceanic Science). 1986. Contract FG02-85ER13442. 17p. NTIS, PC A02/MF A01; GPO Dep. File Number DE87003377.

From Conference on polycyclic aromatic hydrocarbons and astrophysics; Les Houches, France (1 Feb 1986).

PAHs can have several forms in the interstellar medium. To assess the importance of each requires the availability of a collection of high quality, complete mid-ir interstellar emission spectra, a collection of laboratory spectra of PAH samples prepared under realistic conditions and a firm understanding of the microscopic emission mechanism. Given what we currently know about PAHs, the spectroscopic data suggests that there are at least two components which contribute to the interstellar emission spectrum: free molecule sized PAHs producing the narrow features and amorphous carbon particles (which are primarily made up of an irregular "lattice" of PAHs) contributing to the broad underlying components. An exact treatment of the ir fluorescence from highly vibrationally excited large molecules shows that species containing between 20 and 30 carbon atoms are responsible for the narrow features, although the spectra match more closely with the spectra of amorphous carbon particles. Since little is known about the spectroscopic properties of free PAHs and PAH clusters, much laboratory work is called for in conjunction with an observational program which focuses on the spatial characteristics of the spectra. In this way the distribution and evolution of carbon from molecule to particle can be traced. 38 refs., 9 figs.

34005 **(CONF-8607113—3) Astrophysical cosmology.** Bardeen, J.M. (Washington Univ., Seattle (USA). Dept. of Physics). 1986. Contract AC06-81ER40048. 10p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87008239.

From 11. international conference on general relativity and gravitation; Stockholm, Sweden (1 Jul 1986).

The last several years have seen a tremendous ferment of activity in astrophysical cosmology. Much of the theoretical impetus has come from particle physics theories of the early universe and candidates for dark matter, but what promise to be even more significant are improved direct observations of high z galaxies and intergalactic matter, deeper and more comprehensive redshift surveys, and the increasing power of computer simulations of the dynamical evolution of large scale structure. Upper limits on the anisotropy of the microwave background radiation are gradually getting tighter and constraining more severely theoretical scenarios for the evolution of the universe. 47 refs.

34006 **(FNAL/C—87/35-A) Toward the inflationary paradigm: Lectures on inflationary cosmology.** Turner, M.S. (Fermi National Accelerator Lab., Batavia, IL (USA); Chicago Univ., IL (USA)). Feb 1987. Contract AC02-76CH03000. 34p. (CONF-8605247—1-Summ.; CONF-8606261—2-Summ.; CONF-8606294—1-Summ.; CONF-8608170—1-Summ.). NTIS, PC A03. File Number DE87007037.

From Gauge theories and the early universe conference; Erice, Italy (1 May 1986).

Guth's inflationary Universe scenario has revolutionized our thinking about the very early Universe. The inflationary scenario offers the possibility of explaining a handful of very fundamental cosmological facts - the homogeneity, isotropy, and flatness of the Universe, the origin of density inhomogeneities and the origin of the baryon asymmetry, while at the same time avoiding the monopole problem. It is based upon microphysical events which occurred early ($t \leqq 10^{-34}$ sec) in the history of the Universe, but well after the planck epoc ($t \geqq 10^{-43}$ sec). While Guth's original model was fundamentally flawed, the variant based on the slow-rollover transition proposed by Linde, and Albrecht and Steinhardt (dubbed 'new inflation') appears viable. Although old inflation and the earliest models of new inflation were based upon first order phase transitions associated with spontaneous-symmetry breaking (SSB), it now appears that the inflationary transition is a much more generic phenomenon, being associated with the evolution of a weakly-coupled scalar field which for some reason or other was initially displaced from the minimum of its potential. Models now exist which are based on a wide variety of microphysics: SSB, SUSY/SUGR, compactification of extra dimensions, R^2 gravity, induced gravity, and some random, weakly-coupled scalar field. While there are several models which successfully implement the inflation, none is particularly compelling and all seem somewhat ad hoc. The common distasteful feature of all the successful models is the necessity of a small dimensionless number in the model - usually in the form of a dimensionless coupling of order 10^{-15}. All inflationary scenarios rely upon the assumption that vacuum energy was once dynamically very significant, whereas today there exists every evidence that it is not. 133 refs., 17 figs.

34007 **(FNAL/C—87/65-E) Limits on the abundance and coupling of cosmic axions.** DePanfilis, S.; Melissinos, A.C.; Moskowitz, B.E.; Rogers, J.T.; Semertzidis, Y.K.; Wuensch, W.U.; Halama, H.J.; Prodell, A.G.; Fowler, W.B.; Kerns, Q. (Rochester Univ., NY (USA). Dept. of Physics and Astronomy; Brookhaven National Lab., Upton, NY (USA); Fermi National Accelerator Lab., Batavia, IL (USA)). Mar 1987. Contract AC02-76CH03000. 17p. (CONF-8703121—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009435.

From Telemark IV - neutrino mass and neutrino astrophysics; Ashland, WI, USA (16 Mar 1987).

We report preliminary results from a search for galactic axions in the mass range $4.5 < m/sub\ a/ < 5.0\ \mu eV$. For an axion line width $\Gamma/sub\ a/ \leqq 8 \times 10^{-13}$ eV, we obtain the experimental limit $(g/sub\ a\gamma\gamma/m/sub\ a/)^2 rho/sub\ a/ < 1.4 \times 10^{-41}$. The theoretical prediction is $(g/sub\ a\gamma\gamma/m/sub\ a/)^2 rho/sub\ a/ = 3.9 \times 10^{-44}$ with the local galactic axion density $rho/sub\ a/ = 300\ MeV/cm^3$. We have also searched for the presence of a continuous spectrum of light pseudoscalar particles; assuming that the local galactic axion density is composed of axions with masses uniformly distributed between 4.5 and 5.0 μeV, we find that $g/sub\ a\gamma\gamma/ < 2 \times 10^{-30}$ MeV/sup 1/2/ cm/sup 3/2/ $\simeq 10^{11}$ GeV^{-1}. Limits have also been set on the production of light pseudoscalar x particles; we find $g/sub\ x\gamma\gamma/ < 10^{-34}$ MeV/sup 1/2/ cm/sup 3/2/ $\simeq 10^{-5}$ GeV^{-1} for $0 < m/sub\ x/ \leqq 4\mu eV$. 20 refs., 7 figs., 1 tab.

34008 **(LA-UR—87-1397) Predicting the production rates of cosmogenic nuclides in extraterrestrial matter.** Reedy, R.C. (Los Alamos National Lab., NM (USA)). 1987. Contract W-7405-ENG-36. 26p. (CONF-8704112—1). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87009008.

From 4. international symposium on accelerator mass spectrometry; Ontario, Canada (27 Apr 1987).

The production rates of nuclides made by the galactic and solar cosmic rays are important in the interpretations of measurements made with lunar samples, meteorites, and cosmic spherules. Production rates of cosmogenic nuclides have been predicted by a variety of methods that are reviewed in this paper, ranging from systematic studies of one or a group of meteorites to purely theoretical calculations. Production rates can vary with the chemical composition and the preatmospheric depth of the sample and with the size and shape of the object. While the production systematics for cosmogenic nuclides are fairly well known, our ability to predict their production rates can be improved, with a corresponding increase in the scientific return. Additional detailed studies of cosmogenic nuclides in extraterrestrial objects are needed, especially for fairly small and very large objects. Nuclides made in simulation experiments and cross sections for many major nuclear reactions should be measured. Such studies are especially needed for the long-lived radionuclides that have only recently become readily measurable by accelerator mass spectrometry. 34 refs., 5 figs.

34009 **(N—87-17584) International ultraviolet explorer observing program: Ultraviolet observations of selected astronomical sources. Semiannual status report, 7 July-31 December 1986.** Halpern, J. (Columbia Univ., New York (USA)). Feb 1987. 5p. (NASA-CR—180155; NAS—1.26:180155; CAL—1638). NTIS, PC A02/MF A01.

Progress is described for the following topics: rapid variations in the far ultraviolet spectrum of the cool Ap star 21 Com; elliptical Seyfert galaxies; variations of cool Ap stars with strong magnetic fields; and x-ray selected BL Lac Objects.

34010 **(N—87-19328) Energetic Phenomena on the Sun: The Solar Maximum Mission Flare Workshop. Proceedings.** Kundu, M.; Woodgate, B. (National Aeronautics and Space Administration, Greenbelt, MD (USA). Goddard Space Flight Center). Dec 1986. 423p. (NASA-CP—2439; NAS—1.55:2439; CONF-8301119—). NTIS, PC A18/MF A01.

From Solar Maximum Mission flare workshop: energetic phenomena on the sun; Greenbelt, MD, USA (24 Jan 1983).

The general objectives of the conference were as follows: (1) Synthesize flare studies after three years of Solar Maximum Mission (SSM) data analysis. Encourage a broader participation in the SMM data analysis and combine this more fully with theory and other data sources-data obtained with other spacecraft such as the HINOTORI, p78-1, and ISEE-3 spacecrafts, and with the Very Large Array (VLA) and many other ground-based instruments. Many coordinated data sets, unprecedented in their breadth of coverage and multiplicity of sources, had been obtained within the structure of the Solar Maximum Year (SMY). (2) Stimulate joint studies, and publication in the general scientific literature. The intended primary benefit was for informal collaborations to be started or broadened at the Workshops with subsequent publications. (3) Provide a special publication resulting from the Workshop.

34011 (N—87-19328, pp vp) **Magnetohydrodynamic instability.** Priest, E.R.; Cargill, P.; Forbes, T.G.; Hood, A.W.; Steinolfson, R.S. Dec 1986. NTIS, PC A18/MF A01. (NASA-CP—2439; NAS—1.55:2439; CONF-8301119—).

From Solar Maximum Mission flare workshop: energetic phenomena on the sun; Greenbelt, MD, USA (24 Jan 1983).

There have been major advances in the theory of magnetic reconnection and of magnetic instability, with important implications for the observations, as follows: (1) Fast and slow magnetic shock waves are produced by the magnetohydrodynamics of reconnection and are potential particle accelerators. (2) The impulsive bursty regime of reconnection gives a rapid release of magnetic

energy in a series of bursts. (3) The radiative tearing mode creates cool filamentary structures in the reconnection process. (4) The stability analyses imply that an arcade can become unstable when either its height or twist of plasma pressure become too great.

34012 (N—87-19328, pp vp) **Preflare magnetic and velocity fields.** Hagyard, M.J.; Gaizauskas, V.; Chapman, G.A.; Deloach, A.C.; Gary, G.A.; Jones, H.P.; Karpen, J.T.; Martres, M.J.; Porter, J.G.; Schmeider, B. Dec 1986. NTIS, PC A18/MF A01. (NASA-CP—2439; NAS—1.55:2439; CONF-8301119—).

From Solar Maximum Mission flare workshop: energetic phenomena on the sun; Greenbelt, MD, USA (24 Jan 1983).

A characterization is given of the preflare magnetic field, using theoretical models of force free fields together with observed field structure to determine the general morphology. Direct observational evidence for sheared magnetic fields is presented. The role of this magnetic shear in the flare process is considered within the context of a MHD model that describes the buildup of magnetic energy, and the concept of a critical value of shear is explored. The related subject of electric currents in the preflare state is discussed next, with emphasis on new insights provided by direct calculations of the vertical electric current density from vector magnetograph data and on the role of these currents in producing preflare brightenings. Results from investigations concerning velocity fields in flaring active regions, describing observations and analyses of preflare ejecta, sheared velocities, and vortical motions near flaring sites are given. This is followed by a critical review of prevalent concepts concerning the association of flux emergence with flares

34013 (N—87-19328, pp vp) **Coronal manifestations of preflare activity.** Schmahl, E.J.; Webb, D.F.; Woodgate, B.; Waggett, P.; Bentley, R.; Hurford, G.; Schadee, A.; Schrijver, J.; Harrison, R.; Martens, P. Dec 1986. NTIS, PC A18/MF A01. (NASA-CP—2439; NAS—1.55:2439; CONF-8301119—).

From Solar Maximum Mission flare workshop: energetic phenomena on the sun; Greenbelt, MD, USA (24 Jan 1983).

A variety of coronal manifestations of precursors or preheating for flares are discussed. Researchers found that almost everyone with a telescope sees something before flares. Whether an all-encompassing scenario will ever be developed is not at all clear at present. The clearest example of preflare activity appears to be activated filaments and their manifestations, which presumably are signatures of a changing magnetic field. But researchers have seen two similar eruptions, one without any evidence of emerging flux (Kundu et al., 1985) and the other with colliding poles (Simon et al., 1984). While the reconnection of flux is generally agreed to be required to energize a flare, the emergence of flux from below (at least on short timescales and in compact regions) does not appear to be a necessary condition. In some cases the cancelling of magnetic flux (Martin, 1984) by horizontal motions instead may provide the trigger (Priest, 1985). Researchers found similarities and some differences between these and previous observations. The similarities, besides the frequent involvement of filaments, include compact, multiple precursors which can occur both at and near (not at) the flare site, and the association between coronal sources and activity lower in the atmosphere (i.e., transition zone and chromosphere).

34014 (N—87-19328, pp vp) **Particle acceleration.** Vlahos, L.; Machado, M.E.; Ramaty, R.; Murphy, R.J.; Alissandrakis, C.; Bai, T.; Batchelor, D.; Benz, A.O.; Chupp, E.; Ellison, D. Dec 1986. NTIS, PC A18/MF A01. (NASA-CP—2439; NAS—1.55:2439; CONF-8301119—).

From Solar Maximum Mission flare workshop: energetic phenomena on the sun; Greenbelt, MD, USA (24 Jan 1983).

Data are compiled from Solar Maximum Mission and Hinothori satellites, particle detectors in several satellites, ground based instruments, and balloon flights in order to answer fundamental questions relating to: (1) the requirements for the coronal magnetic field structure in the vicinity of the energization source; (2) the height (above the photosphere) of the energization source; (3) the time of energization; (4) transistion between coronal heating and flares; (5) evidence for purely thermal, purely nonthermal and hybrid type flares; (6) the time characteristics of the energization source; (7) whether every flare accelerates protons; (8) the location of the interaction site of the ions and relativistic electrons; (9) the energy spectra for ions and relativistic electrons; (10) the relationship between particles at the Sun and interplanetary space; (11) evidence for more than one acceleration mechanism; (12) whether there is single mechanism that will accelerate particles to all energies and also heat the plasma; and (13) how fast the existing mechanisms accelerate electrons up to several MeV and ions to 1 GeV.

34015 (N—87-19328, pp vp) **Impulsive phase transport.** Canfield, R.C.; Bely-dubau, F.; Brown, J.C.; Dulk, G.A.; Emslie, A.G.; Enome, S.; Gabriel, A.H.; Kundu, M.R.; Melrose, D.; Neidig, D.F. Dec 1986. NTIS, PC A18/MF A01. (NASA-CP—2439; NAS—1.55:2439; CONF-8301119—).

From Solar Maximum Mission flare workshop: energetic phenomena on the sun; Greenbelt, MD, USA (24 Jan 1983).

The transport of nonthermal electrons is explored. The thick-target electron beam model, in which electrons are presumed to be accelerated in the corona and typically thermalized primarily in the chromosphere and photosphere, is supported by observations throughout the electromagnetic spectrum. At the highest energies, the anisotropy of gamma-ray emission above 10 MeV clearly indicates that these photons are emitted by anisotropically-directed particles. The timing of this high-energy gamma-radiation with respect to lower-energy hard x radiation implies that the energetic particles have short life-times. For collisional energy loss, this means that they are stopped in the chromosphere or below. Stereoscopic (two-spacecraft) observations at hard x ray energies (up to 350 keV) imply that these lower-energy (but certainly nonthermal) electrons are also stopped deep in the chromosphere. Hard x ray images show that, in spatially resolved flares whose radiation consists of impulsive bursts, the impulsive phase starts with x radiation that comes mostly from the foot-points of coronal loops whose coronal component is outlined by microwaves.

34016 (N—87-19328, pp vp) **Chromospheric explosions.** Doschek, G.A.; Antiochos, S.K.; Antonucci, E.; Cheng, C.C.; Culhane, J.L.; Fisher, G.H.; Jordan, C.; Leibacher, J.W.; Macneice, P.; Mcwhirter, R.W.P. Dec 1986. NTIS, PC A18/MF A01. (NASA-CP—2439; NAS—1.55:2439; CONF-8301119—).

From Solar Maximum Mission flare workshop: energetic phenomena on the sun; Greenbelt, MD, USA (24 Jan 1983).

Three issues relative to chromospheric explosions were debated. (1) Resolved: The blue-shifted components of x-ray spectral lines are signatures of chromospheric evaporation. It was concluded that the plasma rising with the corona is indeed the primary source of thermal plasma observed in the corona during flares. (2) Resolved: The excess line broading of UV and x-ray lines is accounted for by a convective velocity distribution in evaporation. It is concluded that the hypothesis that convective evaporation produces the observed x-ray line widths in flares is no more than a hypothesis. It is not supported by any self-consistent physical theory. (3) Resolved: Most chromospheric heating is driven by electron beams. Although it is possible to cast doubt on many lines of evidence for electron beams in the chromosphere, a balanced view that debaters on both sides of the question might agree to is that electron beams probably heat the low corona and upper chromosphere, but their direct impact on evaporating the chromosphere is energetically unimportant when compared to conduction. This represents a major departure from the thick-target flare models that were popular before the Workshop.

34017 (N—87-19328, pp vp) **Flare energetics.** Wu, S.T.; Dejager, C.; Dennis, B.R.; Hudson, H.S.; Simnett, G.M.; Strong, K.T.; Bentley, R.D.; Bornmann, P.L.; Bruner, M.E.; Cargill, P.J. Dec 1986. NTIS, PC A18/MF A01. (NASA-CP—2439; NAS—1.55:2439; CONF-8301119—).

From Solar Maximum Mission flare workshop: energetic phenomena on the sun; Greenbelt, MD, USA (24 Jan 1983).

In this investigation of flare energetics, researchers sought to establish a comprehensive and self-consistent picture of the sources and transport of energy within a flare. To achieve this goal, they chose five flares in 1980 that were well observed with instruments on the Solar Maximum Mission, and with other space-borne and ground-based instruments. The events were chosen to represent various types of flares. Details of the observations available for them and the corresponding physical parameters derived from these

data are presented. The flares were studied from two perspectives, the impulsive and gradual phases, and then the results were compared to obtain the overall picture of the energics of these flares. The role that modeling can play in estimating the total energy of a flare when the observationally determined parameters are used as the input to a numerical model is discussed. Finally, a critique of the current understanding of flare energetics and the methods used to determine various energetics terms is outlined, and possible future directions of research in this area are suggested.

34018 (N—87-19328, pp vp) **Energetics of the gradual phase.** Strong, K.T.; Bentley, R.D.; Bornmann, P.L.; Bruner, M.E.; Cargill, P.J.; Doyle, J.G.; Lemen, J.R.; Pallavicini, R.; Peres, G.; Serio, S. Dec 1986. NTIS, PC A18/MF A01. (NASA-CP—2439; NAS—1.55:2439; CONF-8301119—).

From Solar Maximum Mission flare workshop: energetic phenomena on the sun; Greenbelt, MD, USA (24 Jan 1983).

Reseachers compare results with those in the chapter by Moore et al. (1980), who reached five main conclusions about the gradual phase: (1) the typical density of the soft x-ray emitting plasma is between 10 to the 11th power and 10 to the 12th power cm-3 for compact flares and between 10 to the 10th power and 10 to the 11th power cm-3 for a large-area flare; (2) cooling is by conduction and radiation in roughly equal proportions; (3) continual heating is needed in the decay phase of two-ribbon flares; (4) continual heating is probably not needed in compact events; (5) most of the soft-x-ray-emitting plasma results from chromospheric evaporation. The goal was to reexamine these problems with the data from the Solar Maximum Mission (SMM) and other supporting instruments as well as to take advantage of recent theoretical advances. SMM is capable of measuring coronal temperatures more accurately and with a better cadence than has been possible before. The SMM data set is also unique in that the complete transit of an active region was observed, with soft x-ray and UV images being taken every few minutes. Researcher's were therefore able to establish the pre-flare conditions of the region and see whether anything has changed as a result of the flare. The assumptions made in attempting to determine the required plasma parameters are described. The derived parameters for the five prime flares are presented, and the role of numerical simulations is discussed.

34019 (N—87-19328, pp vp) **Relationships among the phases.** Crannell, C.J.; Hudson, H.S. Dec 1986. NTIS, PC A18/MF A01. (NASA-CP—2439; NAS—1.55:2439; CONF-8301119—).

From Solar Maximum Mission flare workshop: energetic phenomena on the sun; Greenbelt, MD, USA (24 Jan 1983).

The overall flare process involves phenomena characterized as the impulsive and gradual phases, following the x-ray signature first recognized by Kane (1969). In addition, evidence exists for a pre-flare phase in some flares, and recent Solar Maximum Mission data have shown that a post-flare phase, in which extensive and energetically important coronal activity occurs, may also exist. The data to describe the pre-flare and post-flare phases are insufficient to place them properly into an overall picture of the energetics, aside from noting that these phases may indeed be significant from the energetics point of view. What is presently known is reviewed and comments are made about the possible interactions among the flare structures involved.

34020 (N—87-19328, pp vp) **Characterization of total flare energy.** Hudson, H.S. Dec 1986. NTIS, PC A18/MF A01. (NASA-CP—2439; NAS—1.55:2439; CONF-8301119—).

From Solar Maximum Mission flare workshop: energetic phenomena on the sun; Greenbelt, MD, USA (24 Jan 1983).

It is concluded that the estimates of total energy in the prime flares lie well below the Active Cavity Radiometer Irradiance Monitor upper limits. This is consistent with our knowledge of the energy distribution in solar flares. Insufficient data exist for us to be very firm about this conclusion, however, and major energetic components could exist undetected, especially in the EUV-XUV and optical bands. In addition, the radiant energy cannot quantitatively be compared at this time with non-radiant terms because of even larger uncertainties in the latter.

34021 (N—87-19328, pp vp) **Review of impulsive phase phenomena.** Dejager, C. Dec 1986. NTIS, PC A18/MF A01. (NASA-CP—2439; NAS—1.55:2439; CONF-8301119—).

From Solar Maximum Mission flare workshop: energetic phenomena on the sun; Greenbelt, MD, USA (24 Jan 1983).

A brief review is given of impulsive phase phenomena in support of the models used to compute the energies of the different components of the flares under study. The observational characteristics of the impulsive phase are discussed as well as the evidence for multi-thermal or non-thermal phenomena. The significance of time delays between hard x rays and microwaves is discussed in terms of electron beams and Alfven waves, two-step acceleration, and secondary bursts at large distances from the primary source. Observations indicating the occurrence of chromospheric evaporation, coronal explosions, and thermal conduction fronts are reviewed briefly, followed by the gamma ray and neutron results. Finally, a preferred flare scenario and energy source are presented involving the interactions in a complex of magnetic loops with the consequent reconnection and electron acceleration.

34022 (N—87-19328, pp vp) **Coronal mass ejections and coronal structures.** Hildner, E.; Bassi, J.; Bougeret, J.L.; Duncan, R.A.; Gary, D.E.; Gergely, T.E.; Harrison, R.A.; Howard, R.A.; Illing, R.M.E.; Jackson, B.V. Dec 1986. NTIS, PC A18/MF A01. (NASA-CP—2439; NAS—1.55:2439; CONF-8301119—).

From Solar Maximum Mission flare workshop: energetic phenomena on the sun; Greenbelt, MD, USA (24 Jan 1983).

Research on coronal mass ejections (CMF) took a variety of forms, both observational and theoretical. On the observational side there were: case studies of individual events, in which it was attempted to provide the most complete descriptions possible, using correlative observations in diverse wavelengths; statistical studies of the properties of CMEs and their associated activity; observations which may tell us about the initiation of mass ejections; interplanetary observations of associated shocks and energetic particles; observations of CMEs traversing interplanetary space; and the beautiful synoptic charts which show to what degree mass ejections affect the background corona and how rapidly (if at all) the corona recovers its pre-disturbance form. These efforts are described in capsule form with an emphasis on presenting pictures, graphs, and tables so that the reader can form a personal appreciation of the work and its results.

34023 (N—87-19328, pp vp) **Intercomparison of numerical models of flaring coronal loops.** Kopp, R.A.; Fisher, G.H.; Macneice, P.; Mcwhirter, R.W.P.; Peres, G. Dec 1986. NTIS, PC A18/MF A01. (NASA-CP—2439; NAS—1.55:2439; CONF-8301119—).

From Solar Maximum Mission flare workshop: energetic phenomena on the sun; Greenbelt, MD, USA (24 Jan 1983).

The proposed Benchmark Problem consists of an infinitesimal magnetic flux tube containing a low-beta plasma. The field strength is assumed to be so large that the plasma can move only along the flux tube, whose shape remains invariant with time (i.e., the fluid motion is essentially one-dimensional). The flux tube cross section is taken to be constant over its entire length. In planar view the flux tube has a semi-circular shape, symmetric about its midpoint s = s sub max and intersecting the chromosphere-corona interface (CCI) perpendicularly at each foot point. The arc length from the loop apex to the CCI is 10,000 km. The flux tube extends an additional 2000 km below the CCI to include the chromosphere, which initially has a uniform temperature of 8000 K. The temperature at the top of the loop was fixed initially at 2 X 1 million K. The plasma is assumed to be a perfect gas (gamma = 5/3), consisting of pure hydrogen which is considered to be fully ionized at all temperatures. For simplicity, moreover, the electron and ion temperatures are taken to be everywhere equal at all times (corresponding to an artificially enhanced electron-ion collisional coupling). While there was more-or-less unanimous agreement as to certain global properties of the system behavior (peak temperature reached, thermal-wave time scales, etc.), no two groups could claim satisfactory accord when a more detailed comparison of solutions was attempted.

34024 (N—87-20055) Space technology plasma issues in 2001. Garrett, H.; Feynman, J.; Gabriel, S. (Jet Propulsion Lab., Pasadena, CA (USA)). Oct 1986. 470p. (NASA-CR—180231; JPL-PUB—86-49; NAS—1.26:180231; CONF-8609284—). NTIS, PC A20/MF A01.

From Workshop on space technology plasma issues in 2001; Pasadena, CA, USA (24 Sep 1986).

The purpose of the workshop was to identify and discuss plasma issues that need to be resolved during the next 10 to 20 years (circa 2001) to facilitate the development of the advanced space technology that will be required 20 or 30 years into the future. The workshop consisted of 2 days of invited papers and 2 sessions of contributed poster papers. During the third day the meeting broke into 5 working groups, each of which held discussions and then reported back to the conference as a whole. The five panels were: Measurements Technology and Active Experiments Working Group; Advanced High-Voltage, High-Power and Energy-Storage Space Systems Working Group; Large Structures and Tethers Working Group; Plasma Interactions and Surface/Materials Effects Working Group; and Beam Plasmas, Electronic Propulsion and Active Experiments Using Beams Working Group.

34025 (UCRL—92627) Galaxies and Saturn's rings: Gravitational analogues of nonneutral plasmas. Mark, J.W.K. (Lawrence Livermore National Lab., CA (USA)). 25 Apr 1985. Contract W-7405-ENG-48. 34p. (CONF-8503105—11). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87008747.

From Orbital dynamics and applications to accelerators workshop; Berkeley, CA, USA (7 Mar 1985).

Orbit and collective dynamics in disk galaxies and in Saturn's rings are gravitational analogues of those occurring in nonneutral plasmas. The interesting problems for such "gravitational plasmas" are analogous to single-disk studies of transverse dynamics in particle beams. Of particular interest are various orbit-resonances with spiral density and bending waves in these disks which are analogous to electrostatic waves in nonneutral beam plasmas. The background physics, terminology and results of astrophysical investigations in these fields are surveyed in this paper. 53 refs., 19 figs., 1 tab.

34026 Underground search for muons correlated with Cygnus X-3. Bionta, R.M.; Blewitt, G.; Bratton, C.B.; Casper, D.; Ciocio, A.; Claus, R.; Crouch, M.; Dye, S.T.; Errede, S.; Foster, G.W. (The University of California, Irvine, California 92717). *Physical Review* [*Section*] *D: Particles and Fields;* **36**: No. 1, 30-36(1 Jul 1987).

We have examined muon data collected with the IMB (Irvine-Michigan-Brookhaven) proton-decay detector in search of a muon flux associated with the x-ray binary Cygnus X-3. A sample of 3.6 x 10^4 muons from the direction of Cygnus X-3 during the period September 1982 until April 1984 shows no evidence of its characteristic 4.8-h periodicity. In the phase interval 0.65 to 0.90 where a signal has been reported by other workers at a similar depth we obtain a 90%-confidence-level limit to the flux of 6.9 x 10/sup -11/ cm/sup -2/sec/sup -1/ for a depth of 1800 m water equivalent. This limit does not conflict with the reported signal. Three subsets of the data taken during Cygnus X-3 radio bursts have been separately analyzed. We find some evidence for an excess in the phase interval 0.50—0.60 at the time of the October 1983 outburst. We examine this excess in detail.

34027 Discovery of a 685 second orbital period from the X-ray source 4U 1820 - 30 in the globular cluster NGC 6624. Stella, L.; White, N.E.; Priedhorsky, W. (EXOSAT Observatory, Darmstadt, West Germany; Los Alamos National Lab., NM; Max-Planck-Institut fuer extraterrestrische Physik, Garching, West Germany). *Astrophysical Journal;* **312**: L17-L21(Jan 1987).

The discovery of a coherent 685 s periodicity in the X-ray source 4U 1820 -30, which is located in the globular cluster NGC 6624, is reported. The modulation has a peak-to-peak amplitude of up to 3 percent and was independently detected in three observations by the EXOSAT Observatory. This period is unlikely to represent the rotation of a neutron star, because accretion torques should cause it to change by at least 10 s/yr, but observations constrain any change to less than 0.4 s/yr. The period is thus identified as the orbital period of 4U 1820 - 30, the first to be found for a globular cluster X-ray source and the shortest yet identified for any binary system. In this compact system the mass-losing star is probably a low-mass (0.055 solar mass) helium white dwarf. 37 references.

34028 Search for orbital X-ray variation in Scorpius X-1. Priedhorsky, W.C.; Holt, S.S. (Los Alamos National Lab., NM; Max-Planck-Institut fuer Extraterrestrische Physik, Garching, West Germany; NASA, Goddard Space Flight Center, Greenbelt, MD). *Astrophysical Journal;* **312**: 743-747(Jan 1987).

All 5 yr of 3-6 keV monitoring of Sco X-1 by the Ariel 5 all-sky monitor have been reanalyzed to search more sensitively for variation at the 0.787313 d orbital period. The best limits on orbital variations come from data selected to exclude active episodes. Any narrow absorption dip has an average depth less than 1.0 percent (0.1/Delta Phi), where Delta Phi is the width in units of the orbital period (2 sigma confidence level). A weak (0.4 percent) sinusoidal modulation, with 3.2 sigma significance, reaching minimum at phase 0.59 + or - 0.06 with respect to superior conjunction of the optical emission-line source is observed. In any case, the upper limit to a sinusoidal orbital modulation is 0.7 percent. Sco X-1 never - at least not for more than 2 hrs - dipped below its normal quiescent level. 22 references.

34029 Primeval QSOs. Cavaliere, A.; Szalay, A.S. (Roma II Universita, Italy; NASA/Fermilab Astrophysics Group, Batavia, IL; Eotvos Lorand Tudomanyegyetem, Budapest, Hungary). *Astrophysical Journal;* **311**: 589-594(Dec 1986).

The physical processes causing the formation of an increased number of QSOs at redshifts higher than 2 are discussed, along with the implications for the turn-on of active galactic nuclei (AGN) at the same time as QSOs. It is argued that optical and X-ray background data indicate that all but the brightest objects will decline in number at redshifts exceeding 2. Consideration is given to the possibility that accreting black holes are at the center of AGNs and formed within a few billion years of the turn-on of QSOs. A scenario is also explored wherein QSOs are remnant echoes of the epoch of galaxy formation and are thereby a suitable object with which to probe the parent population. 39 references.

34030 Numerical simulations of a magnetically confined jet. Clarke, D.A.; Norman, M.L.; Burns, J.O. (New Mexico Univ., Albuquerque; Los Alamos National Lab., Albuquerque, NM). *Astrophysical Journal;* **311**: L63-L67(Dec 1986).

Preliminary results of two-dimensional, axisymmetric numerical simulations of a propagating jet which possesses a dominating toroidal magnetic field are presented. Unlike its pure hydrodynamical (HD) counterpart, the magnetohydrodynamical (MHD) jet presented here possesses no substantial backflowing cocoon. Rather, most of the material is collected between the HD working surface (terminal Mach disk) and the leading bow shock, forming what is called a nose cone. The nature of the nose cone and other features peculiar to this jet are discussed, along with possible observational implications. 18 references.

34031 Thermal atmosphere of a black hole. Thorne, K.S.; Zurek, W.H.; Price, R.H. pp 280-340 of Black holes: the membrane paradigm. Thorne, K.S.; Price, R.H.; Macdonald, D.A. New Haven, CT; Yale University Press (1986).

Black-hole atmospheres and their thermodynamic properties are explored quantitatively, using a membrane paradigm that includes a 3+1 formalism which splits space-time coordinates into a family of three-dimensional spacelike hypersurfaces and one-dimensional time. The means by which black holes retain their thermal atmosphere and avoid rapid evaporation are examined. Quantum mechanical probability distributions are presented for fiducial observers (FIDO) within a perfectly thermal atmosphere, and deviations from perfect thermality are discussed. Four types of modes of classical or quantized fields around a black hole are introduced (IN, UP, superradiant, and nonsuperradiant) and are used to describe interactions of the atmosphere with the external universe. At-

tention is also given to the statistical-mechanical origin of black-hole entropy, and a second law of thermodynamics is derived for a slowly evolving black hole using statistical-mechanics methods.

34032 **Is Cygnus X-3 strange.** Baym, G.; Kolb, E.W.; McLerran, L.; Walker, T.P.; Jaffe, R.L. (Theory Dept., Fermi National Accelerator Lab., Batavia, IL 60510). pp 338-344 of New particles 1985. Barger, V.; Cline, D.; Halzen, F. Philadelphia, PA; World Scientific Pub. Co. (1986). Contract AC02-76ER03069.

The authors discuss the recently reported measurements of the properties of high energy cosmic rays arriving from the direction of the compact binary X-ray source Cygnus X-3. They argue that the source of these events may be a strange quark star, and that the primary which directly produces them is a low baryon number neutral hadron with multiple strangeness which is stable up to (at least) simultaneous double strangeness changing weak decays.

34033 **High energy neutrinos from Cyg X-3.** Walker, T.P.; Kolb, E.W.; Turner, M.S. (NASA/Fermilab Astrophysics Center, Fermi National Accelerator Lab., P.O. Box 500, Batavia, IL 60510). pp 328-337 of New particles 1985. Barger, V.; Cline, D.; Halzen, F. Philadelphia, PA; World Scientific Pub. Co. (1986).

Assuming that the UHE air showers from Cyg X-3 are produced by photons, the authors calculate the expected neutrino emission from a model which produces the γ-rays in the atmosphere of the Cyg X-3 companion. The authors discuss the possibility of detecting such neutrinos in underground detectors and the constraints that such a signal places on the use of this model in other particle production scenarios.

6402 Atmospheric Physics

34034 (N—87-20055, pp vp) **Earth's magnetosphere as a sample of the plasma universe.** Faelthammar, C.G. Oct 1986. NTIS, PC A20/MF A01. (NASA-CR—180231; JPL-PUB—86-49; NAS—1.26:180231; CONF-8609284—).

From Workshop on space technology plasma issues in 2001; Pasadena, CA, USA (24 Sep 1986).

Plasma processes in the Earth's neighborhood determine the environmental conditions under which space-based equipment for science or technology must operate. These processes are peculiar to a state of matter that is rare on Earth but dominates the universe as whole. The physical, and especially the electrodynamic, properties of this state of matter is still far from well understood. By fortunate circumstances, the magnetosphere-ionosphere system of the Earth provides a rich sample of widely different plasma populations, and, even more importantly, it is the site of a remarkable variety of plasma processes. In different combinations such processes must be important throughout the universe, which is overwhelmingly dominated by matter in the plasma state. Therefore, observations and experiments in the near-Earth plasma serve a multitude of purposes. They will not only (1) clarify the dynamics of the space environment but also (2) widen the understanding of matter, (3) form a basis for interpretating remote observations of astrophysical objects, thereby even (4) help to reconstruct events that led to the evolution of the solar system. Last but not least they will (5) provide know-how required for adapting space-based technology to the plasma environment. Such observations and experiments will require a close mutual interplay between science and technology.

34035 (N—87-20055, pp vp) **Plasma heating, plasma flow and wave production around an electron beam injected into the ionosphere.** Winckler, J.R.; Erickson, K.N. Oct 1986. NTIS, PC A20/MF A01. (NASA-CR—180231; JPL-PUB—86-49; NAS—1.26:180231; CONF-8609284—).

From Workshop on space technology plasma issues in 2001; Pasadena, CA, USA (24 Sep 1986).

A brief historical summary of the Minnesota ECHO series and other relevant electron beam experiments is given. The primary purpose of the ECHO experiments is the use of conjugate echoes as probes of the magnetosphere, but beam-plasma and wave studies were also made. The measurement of quasi-dc electric fields and ion streaming during the ECHO 6 experiment has given a pattern for the plasma flow in the hot plasma region extending to 60m radius about the ECHO 6 electron beam. The sheath and potential well caused by ion orbits is discussed with the aid of a model which fits the observations. ELF wave production in the plasma sheath around the beam is briefly discussed. The new ECHO 7 mission to be launched from the Poker Flat range in November 1987 is described.

6403 Atomic, Molecular, And Chemical Physics

REFER ALSO TO CITATION(S) 33256, 33370, 34234

34036 **(CONF-870498—7) The emittances and brightnesses of high-intensity negative ion sources.** Alton, G.D.; McConnell, J.W. (Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 43p. NTIS, PC A03. File Number DE87008802.

From 7. tandem conference; Berlin, F.R. Germany (6 Apr 1987).

The emittances of high-intensity ion beams extracted from cesium sputter negative ion sources equipped with cylindrical and ellipsoidal solid tungsten and spiral-wound tantalum (General Ionex Corporation, Model 860), and cesium surface ionizers have been measured for several ion species, including $^{12}C^-$, $^{28}Si^-$, $^{58}Ni^-$, and $^{197}Au^-$. While certain sets of data from the ellipsoidal and cylindrical geometry ionizer sources suggest a moderate growth in emittance with increasing negative ion beam intensity I over the range of intensities investigated ($5 \leqq I \leqq 60$ μA) of perhaps 20%, not all data exhibit this dependence, especially those from the Model 860 source. As well, no evidence of an emittance dependence on ion mass of a monotonic nature was found. The emittances of ion beams at the 80% intensity level from the Model 860 source are found to be higher on the average by factors of 1.8 and 1.7, respectively, than those from sources equipped with ellipsoidal and cylindrical geometry cesium surface ionizers.

34037 **(CONF-8703116—4) Measurement of inelasticities for charge correlated multiple ionization of Ne by fast C^{6+} ions.** Schuch, R.; Datz, S.; Dittner, P.F.; Krause, H.F.; Miller, P.D. (Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 14p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009819.

From US-Japan seminar on interactions of highly ionized atoms produced in heavy-ion collisions; Kobe, Japan (1 Mar 1987).

A description of measurements of inelasticities for multiple ionization in fast-single collisions is given for the example of 10 MeV C^{6+} ions with Ne atoms. The degree of multiple ionization was determined by time-of-flight of the recoil ions, extracted by an electric field in coincidence with the projectiles. Their energy loss for a given degree of multiple ionization was measured with a position-sensitive silicon detector in the focal plane of an Elbek magnetic spectrograph with an energy resolution of about 10^{-4}.

34038 **(CRN-CPR—85-10) On the use of analytical approximate expressions for the transfer rate in excitation transfer kinetics.** Kusba, J.; Sipp, B. (Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires). 1985. 12p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87751809.

We present a discussion about the range of validity of the usual approximate transfer rate expressions used in the description of the kinetics of diffusion-modulated excitation transfer, for a reactive interaction of exponential functional form. We simulate the features of energy transfer by a numerical inversion of the exact Laplace transform of the transfer rate. It is shown that for high diffusion coefficients of the order of 10/sup -5/cm/sup 2/s/sup -1/, the kinetics may be well reproduced, even at short times, by the asymptotic form of the transfer rate. For slow molecular displacements, the short time static regime is brought to direct observation, but the transfer rate approaches is asymptotic value at a much later time.

34039 **(DOE/ER/53201—T2) A plasma-optical system modeled using particles.** Hitchon, W.N.G. (Wisconsin Univ., Madison (USA). Dept. of Electrical and Computer Engineering). Feb 1987. 19p. NTIS, PC A02/MF A01. File Number DE87008395.

A 'particle' model of plasma behavior suitable for application to the study of plasma-optical systems has been developed. A plasma-optical system which removes macroscopic droplets from a neutralized beam of ions and electrons, produced by an arc, has been modeled and its performance has been analyzed. The particle model employs an extremely efficient treatment of the electron motion through a background gas, which in this case consists of neutral particles. The distribution of distances traveled by electrons in the course of many collisions with the neutral background is generated using a Monte Carlo method and is sampled from to determine the electron motion at each integration step. In sheath regions, for instance, direct integration is still necessary, but for most electrons the simulation is very fast, largely removing the numerical 'stiffness' of the particle method. This method will be equally effective for time-dependent fields such as occur in RF discharges used in 'plasma processing.' The variation is ion current to a substrate, where the ions deposit as a thin film has been studied. The objective is to maximize the deposition rate while preventing macroscopic particles which arise at the arc from striking the film. An alternative system whose calculated transmittal rate from source to target is higher, for long mean-free-paths, is also examined.

34040 (INIS-mf—10889, pp 59) **Atomic states and excimers observed in electron pulse irradiated argon.** Mehnert, R.; Brede, O.; Hermann, R. Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

34041 (INIS-mf—10889, pp 82) **Xenon heavy atom effect on excited state quenching of hydrocarbons.** Wojnarovits, L.; Silberer, V.; Foeldiak, G. (Magyar Tudomanyos Akademia, Budapest, Hungary). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

34042 (INIS-mf—10902, pp 8) **Calculation of the Stark effect in rare gases.** Schnizer, B.; Ziegelbecker, R. Dec 1986. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702298.

In Annual report (October 1985 - September 1986).

34043 **(JINR-R—2-86-281) Correction of the order of $\alpha 2$ ln/sup α/ to the Fermi splitting of the hydrogen-like atom state.** Tyukhtyaev, Yu.N.; Faustov, R.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 6p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702353.

On the basis of the Logunov - Tavkhelidze quasipotential equation the relativistic correction to the Coulomb wave function is found. A value of the hyperfine splitting of the ground state of hydrogen atom is calculated. 6 references.

34044 **(KIYI—86-6) Autoionization of metal atoms in electron-atom collisions.** Borovik, A.A. (AN Ukrainskoj SSR, Kiev. Inst. Yadernykh Issledovanij). 1986. 20p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702386.

The p^6-subshell electron impact excitation of alkali-earth atoms are considered. An experimental arrangement for an electron emission spectra measuring in electron-atom collisions is described. On the basis of calculations of p^6-subshell excitation and photoabsorption data new results of the identification of lines in electron emission spectra of strontium and barium have been obtained. Spectroscopy classification, decay channels and excitation cross section of the autoionizing states $mp^6n_1l_1n_2l_2n_3l_3$ and $mp^5n_1l_1n_2l_2$ (m=4, 5) are discussed. 22 references, 4 figures, 3 tables.

34045 **(LA-UR—87-150) Microwave-induced air breakdown in a free air geometry.** Armstrong, W.T.; Rousseel-Dupre, R.A.; Karl, R.; Buchwald, M.I.; Graham, G. (Los Alamos National Lab., NM (USA); EG and G Energy Measurements, Inc., Los Alamos, NM (USA)). 1987. Contract W-7405-ENG-36. 3p. (CONF-870723—1). NTIS, PC A02. File Number DE87005105.

From 18. international conference on phenomena in ionized gases; Swansea, UK (13 Jul 1987).

We report on trial experiments, using an open geometry, to measure the breakdown behavior of short, intense microwave pulses in low pressure air.

34046 **(UCRL—94730) Characteristics of transition radiation in the x-ray spectral region.** Moran, M.J. (Lawrence Livermore National Lab., CA (USA)). 6 Jun 1986. Contract W-7405-ENG-48. 9p. (CONF-860880—53). NTIS, PC A02. File Number DE87009946.

From 30. SPIE technical symposium on optics and optoelectronic engineering; San Diego, CA, USA (17 Aug 1986).

Measurements of soft x-ray production by transition radiation have been performed in a series of experiments at the Lawrence Livermore National Laboratory. The results have shown that transition radiation is an intense and predictable source of photons in the soft x-ray energy range. This paper will give a brief review of the general properties of the x-ray distributions generated by these sources. 9 refs., 9 figs.

34047 **(UCRL—94811-Rev.1) Recent measurements of coherent transition radiation.** Moran, M.J. (Lawrence Livermore National Lab., CA (USA)). 25 Sep 1986. Contract W-7405-ENG-48. 14p. (CONF-861114—55-Rev.1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009945.

From 9. international conference on application of accelerators in research and industry; Denton, TX, USA (10 Nov 1986).

An extended series of experiments has been used to investigate transition radiation in the x-ray spectral region. The x-rays were generated at the Lawrence Livermore National Laboratory electron-positron linear accelerator by 54 MeV electrons traversing multiple thin-foil targets. The measured angular and spectral distributions have shown excellent agreement with calculated predictions based on a simplified theoretical description of transition radiation. Recently, energy-resolved measurements of x-ray generation by targets consisting of multiple closely-spaced foils has clearly demonstrated the longitudinal coherence of transition radiation. This behavior might lead to a variety of applications such as tuneable narrow-band x-ray sources, measurement of x-ray dielectric constants, or particle beam diagnostics. These issues will be discussed, and recent results will be presented.

34048 **(UCRL—94882) Microwave production from a plasma driven by a high power relativistic electron beam.** Di Capua, M.S.; Fulkerson, E.S.; Meeker, D.; DeGroot, J. (Lawrence Livermore National Lab., CA (USA); California Univ., Davis (USA). Dept. of Applied Science). 9 Jun 1986. Contract W-7405-ENG-48. 6p. (CONF-8606300—1). NTIS, PC A02. File Number DE87008482.

From High power electron and ion-beam research and technology conference; Osaka, Japan (9 Jun 1986).

Microwave emission from an unmagnetized plasma ($T = 1$ eV, n/sub e/ $= 1.5 \times 10^{11}$ cm^{-3}) driven by an electron beam (2.7 < I/sub b/ < 60 kA, 1.2 < V/sub b/ < 1.4 MV, t/sub rise/ = 15 ns, t/sub pulse/ = 60 ns) emitted from a 93 cm^2 velvet cathode with anode cathode gaps of 3.5 and 6.0 cm has been measured. A 90 μs, 80 A current pulse, emitted from a thermionic lanthanum hexaboride electron source, preionizes a 1.4 mT argon fill in a 1-m-long, 15-cm-diameter Lucite tube. A 6 Ω water dielectric accelerator injects the electron current, 50 μs into the afterglow, into the tube through an aluminized Mylar anode. A Microwave spectrometer measures the radio frequency output in 2 to 18, 18 to 26, and 26 to 47 GHz bands that filters separate into narrower subbands. Digitizers record beam voltage, current, and microwave power obtained from diode detectors. The intrinsic electrical noise of the system is 15 mV p-p. A 3.36 cm-gap diode, delivering a 1.2 MeV, 90 kA beam into the tube, produces an intense pinch beyond the aluminized Mylar anode with little microwave output. A diode

with a 6 cm gap, fills the aperture of the tube with 200 A/cm² (35 kA) of 1.4 MeV electrons that result in intense microwave radiation. The emission takes place in two distinct phases. The 2 to 6 GHz output, that includes ω/sub p/, rises promptly with the current pulse and then decays. For 6 GHz and above, there appears a low level microwave prepulse simultaneous with the 2 to 6 GHz output. This output raises sharply 25 ns after the current pulse begins, and includes frequencies out to and beyond 40 GHz. The radio frequency output falls off before the current pulse ends. The microwave intensity decays monotonically with frequency.

34049 MPI photoelectron spectroscopy of ungerade excited states of acetylene: Intermediate state mixing and ion state selection. Orlando, T.M.; Anderson, S.L.; Appling, J.R.; White, M.G. (Department of Chemistry, State University of New York at Stony Brook, Stony Brook, New York 11794-3400). *Journal of Chemical Physics;* **87**: No. 2, 852-860(15 Jul 1987).

Three photon resonant, four photon (3+1) ionization spectroscopy and photoelectron spectroscopy have been used to study the ungerade excited states of acetylene in the energy range from 74 500 to 90 000 cm^{-1}. Sharp bands from the nR (π^3/sub u/ nsσ/sub g/) and ^{1}Phi/sub u/ (π^3/sub u/ ndδ/sub g/) Rydberg series dominate the MPI spectrum. A large number of Rydberg and valence states which are prominent in VUV absorption spectra are absent or weak in MPI studies. These weak bands are only observable under high power conditions, which suggests that nonradiative decay is rapid enough to depopulate these states before ionization occurs. The photoelectron results provide further insight into the nature of the excited states. Ionization through the sharp bands occurs via $\Delta v = 0$ Franck—Condon transitions, resulting in ions in a single vibrational state. Ionization through bands which are mixed results in complicated ion vibrational distributions including excitation of both cis and trans bends.

34050 Electronic absorption spectroscopy of molecular ions in plasmas by dye laser velocity modulation: The A←X system of N^+_2. Radunsky, M.B.; Saykally, R.J. (Department of Chemistry and The Center for Advanced Materials, Lawrence Berkeley Laboratory and University of California, Berkeley, California 94720). *Journal of Chemical Physics;* **87**: No. 2, 898-901(15 Jul 1987). Contract AC03-76SF00098.

A computer controlled velocity modulation dye laser spectrometer is used to measure the A ^{2}Pi/sub u/←X $^2\Sigma^+$/sub g/ (7,3) band of N^+_2. The Doppler-limited absorption spectra are fit to a model Hamiltonian to obtain precise parameters for the states. The ion rotational temperature was determined to be 461 +- 11, and the translational temperature was estimated to be near 1200 K.

34051 Valence quantum Monte Carlo with ab initio effective core potentials. Hammond, B.L.; Reynolds, P.J.; Lester W.A. Jr. (Materials and Chemical Sciences Division, Lawrence Berkeley Laboratory, University of California, Berkeley, California 94720). *Journal of Chemical Physics;* **87**: No. 2, 1130-1136(15 Jul 1987). Contract AC03-76SF00098.

Effective-core potentials (ECP's) obtained from ab initio methods are implemented in molecular quantum Monte Carlo (QMC). The theory is presented, and applied to the calculation of electron affinities (EA) of Li and Na, the ionization potential (IP) of Mg, the binding energies (D/sub e/) of NaH and Na_2, and the potential energy curve of Na_2. In all cases ECP—QMC results are found to be as accurate as previous all-electron results. In particular, the calculated quantities (vs experimental values) are (in eV): EA(Li) = 0.611 +- 0.020 (0.620), EA(Na) = 0.555 +- 0.021 (0.546), IP(Mg) = 7.637 +- 0.026 (7.646), D/sub e/ (NaH) = 1.954 +- 0.073 (1.971), and D/sub e/ (Na_2) = 0.746 +- 0.020 (0.747). In addition, the statistical precision obtained surpasses that which can be readily achieved in all-electron QMC calculations on these systems.

34052 Transition rates of atoms near spherical surfaces. Chew, H. (Department of Physics, Clarkson University, Potsdam, New York 13676). *Journal of Chemical Physics;* **87**: No. 2, 1355-1360(15 Jul 1987).

We study the transition rates of atoms inside and outside dielectric spheres. The rates are calculated classically, and the results are shown to agree with those obtained using other approaches. For atoms outside, our analytic results are equivalent to those of Ruppin in the case of zero conductivity. Numerical results are presented, which show that resonances have important effects on the transition rates, and that enhancement factors of hundreds are possible under suitable conditions.

34053 Two-dimensional imaging of state-selected photodissociation products detected by multiphoton ionization. Chandler, D.W.; Houston, P.L. (Combustion Research Facility, Sandia National Laboratories, Livermore, California 94550). *Journal of Chemical Physics;* **87**: No. 2, 1445-1447(15 Jul 1987).

A new technique is presented that makes it possible, with a single laser pulse, to determine the three-dimensional spatial distribution of state-selected photoproducts. Initially, absorption of a photon from a laser beam causes fragmentation of a molecule. Multiphoton ionization is used to select the internal state of a desired fragment without perturbing its velocity. Following a short delay, the three-dimensional spatial distribution caused by the fragment velocities is projected onto two dimensions by accelerating the state-selected fragment ions into the surface of a channel plate particle multiplier. Electrons emerging from the multiplier are imaged onto a phosphorescent screen for analysis by a digital-image processing device such as a two-dimensional optical multichannel analyzer. The three-dimensional spatial distribution is reconstructed by taking the Hankel transform of the Fourier transform of the projection. The technique is illustrated by recording the spatial distribution of methyl fragments produced in their vibrational ground state by the 266 nm photodissociation of CH_3I. From this study it is determined that the fraction of CH_3(v = 0) formed in coincidence with I($^2P_1$/sub //$_2$) is greater than 0.95, the rest being formed in coincidence with I($^2P_3$/sub //$_2$) ground state.

34054 Global potential energy hypersurface for dynamical studies of energy transfer in HF—HF collisions. Redmon, M.J.; Binkley, J.S. (Chemical Dynamics, Columbus, Ohio 43220). *Journal of Chemical Physics;* **87**: No. 2, 969-982(15 Jul 1987).

The interaction energy of two HF molecules at 1332 individual points has been calculated with Moeller—Plesset (many—body) perturbation theory at the MP4-SDTQ level using a 6-311G** basis set. 293 of the points correspond to stretching of one HF molecule from its equilibrium geometry. No attempt was made to use a sufficiently fine grid to accurately describe the well region corresponding to hydrogen bonding. However, the location and minimum energy are consistent with experiment and other accurate theoretical results. An extensive global fit (rms error of 1 kcal/mol) is reported of 1319 points (below 10 eV of potential energy) using a modified London potential with corrections obtained using polynomials through four-body interactions. A model electrostatic potential represents the long-range interaction. In addition, the use of an expansion in products of three Legendre functions is discussed. It is shown that the latter approach, although accurately fitting the ab initio data, has difficulties interpolating in regions of the surface exhibiting diverse magnitudes of potential energy, and therefore must be used with caution. This surface should be useful for studies of T—V—R processes in this system.

34055 Comparison of close coupling and quasiclassical trajectory calculations for rotational energy transfer in the collision of two HF molecules on a realistic potential energy surface. Schwenke, D.W.; Truhlar, D.G.; Coltrin, M.E. (Department of Chemistry and Supercomputer Institute, University of Minnesota, Minneapolis, Minnesota 55455). *Journal of Chemical Physics;* **87**: No. 2, 983-992(15 Jul 1987).

We report rigid-rotator close coupling calculations and quasiclassical trajectory calculations for HF—HF collisions with total angular momentum zero. The results are compared to test the trajectory method.

34056 **Effect of resonances on collisional energy transfer.** Sumpter, B.G.; Thompson, D.L.; Noid, D.W. (Department of Chemistry, Oklahoma State University, Stillwater, Oklahoma). *Journal of Chemical Physics;* **87**: No. 2, 1012-1021(15 Jul 1987).

The effect of resonances on the collinear inelastic scattering of CO_2 with He, Ne, and Ar has been studied. The initial conditions for the CO_2 molecule were chosen by using Poincare surfaces of section to identify trajectories which lie on resonant tori. Near-resonant and nonresonant trajectories have also been examined. The dynamics of the CO_2 molecule undergoes a dramatic change as a rare gas atom approaches. Resonances are created and destroyed and, in some cases, a transition from quasiperiodic to chaotic motion occurs. The energy transfer is enhanced for trajectories involving resonant or near-resonant CO_2 states.

34057 **Effects of configuration mixing on computed dielectronic-recombination rates.** Cowan, R.D.; Griffin, D.C. (Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review* [*Section*] *A: General Physics;* **36**: No. 1, 26-32(1 Jul 1987). Contract AC05-84OR21400;W-7405-ENG-36.

We investigate qualitatively and semiquantitatively the effects on computed dielectronic-recombination rate coefficients of including mixing between basis states of two or more configurations, as opposed to the single-configuration approximation. We have made model-parameter studies for two-electron systems, and have also considered physically realistic three- and four-electron systems. We have attempted to categorize the various circumstances under which configuration-interaction effects are significant, but overall effects appear to be generally small: usually no more than 10—20 %.

34058 **New quantum numbers in collision theory. III. Symmetries of the scattering geometry.** Lee, C.W.; Fano, U. (James Franck Institute, University of Chicago, Chicago, Illinois 60637). *Physical Review* [*Section*] *A: General Physics;* **36**: No. 1, 66-73(1 Jul 1987).

Scattering geometries are represented by tensorial parameters classified according to symmetry under permutations P and Q: P changes a base set of wave functions into its Hermitian conjugate and Q interchanges the directions of incidence and scattering. These parameters interlink initial and final states of projectile and target, a linkage mediated by the angular momentum j/sub t/ transferred in the collision. Collision cross sections and expectation values of the observables are constructed as sums of geometrical parameters with different symmetries, weighted by dynamical parameters.

34059 **New quantum numbers in collision theory. IV. Separation of the first Born contributions.** Lee, C.W.; Fano, U. (James Franck Institute, University of Chicago, Chicago, Illinois 60637). *Physical Review* [*Section*] *A: General Physics;* **36**: No. 1, 74-75(1 Jul 1987).

The major contribution to forward scattering amplitudes for inelastic electron collisions, from the first Born approximation, is separated out from the remainder in the expressions of differential cross sections and of target orientation, for purposes of analysis. Simple results of this analysis are presented for e+He collisions, as a preliminary to a more detailed analysis of the same data in a separate paper.

34060 **Photoelectron dynamics of the valence shells of benzene as a function of photon energy.** Carlson, T.A.; Gerard, P.; Krause, M.O.; Grimm, F.A.; Pullen, B.P. (Chemistry Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831-6201). *Journal of Chemical Physics;* **86**: No. 12, 6918-6926(15 Jun 1987). Contract AC05-84OR21400.

Angle-resolved photoelectron spectroscopy was carried out on the first nine valence orbitals of benzene using synchrotron radiation as a photon source. From these data cross sections σ and angular distribution parameters β were obtained over a photon energy of 10 to 34 eV. The experimental results are compared with calculations for the same parameters, based on the multiple scattering Xα method. Considering the complexity of the molecule, the comparison is gratifying. A number of shape resonances, which are predicted, have been identified experimentally. The orbital assignments for the photoelectron spectrum of benzene have been reexamined in view of the cross sections and angular distributions and have for the most part been verified.

34061 **Spectroscopy of the group VIb transition metal hexacarbonyls using the electron impact method.** Koerting, C.F.; Walzl, K.N.; Kuppermann, A. (Arthur Amos Noyes Laboratory of Chemical Physics, California Institute of Technology, Pasadena, California 91125). *Journal of Chemical Physics;* **86**: No. 12, 6646-6653(15 Jun 1987).

The electron energy-loss spectra of $Cr(CO)_6$, $Mo(CO)_6$, and $W(CO)_6$ were measured at impact energies of 25, 50, and 100 eV and at scattering angles from 0° to 90°. The differential cross sections (DCS's) were obtained for several features in the 3—7 eV energy-loss region. The symmetry-forbidden nature of the $^1A_1$/sub g/$\rightarrow{}^1A_1$/sub g/,2t_2/sub g/ (π)$\rightarrow$3t_2/sub g/(π^*) transition in these compounds was confirmed. Several low energy excitations were assigned to ligand field transitions on the basis of the energy and angular behavior of their associated DCS's. No transitions which could clearly be assigned to singlet$\rightarrow$triplet excitations involving metal orbitals were located in these molecules. In addition, a number of states lying above the first ionization potential were observed for the first time. Several of these excitations seem to correspond quite well to some of the transitions observed in free CO.

34062 **Theory of anisotropy transfer and calculations of alignment of np states populated in electron capture by highly charged ions.** Lin, C.D.; Macek, J.H. (Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review* [*Section*] *A: General Physics;* **35**: No. 12, 5005-5011(15 Jun 1987). Contract W-31-109-ENG-38;FG02-85ER13440.

The excited states of highly charged ions populated by charge transfer are frequently aligned. The alignment of each nl level often reflects the initial alignment due to the collision as well as the alignment of higher levels which cascade down to this level. We adapt the theory of alignment transfer and apply it to analyze the alignment of Lyman radiations following ion-atom collisions. The theory is illustrated using computed alignments of higher levels reported earlier and the results are compared with recent measurements.

34063 **Auger and radiative decay rates of 1s vacancy states in the boron isoelectronic sequence: Effects of relativity and configuration interaction.** Chen, M.H.; Crasemann, B. (University of California, Lawrence Livermore National Laboratory, Livermore, California 94550). *Physical Review* [*Section*] *A: General Physics;* **35**: No. 11, 4579-4585(1 Jun 1987). Contract W-7405-ENG-48.

Wavelengths, radiative transition probabilities, Auger energies, and Auger rates have been calculated relativistically for $1s2s^22p^3$, $1s2s2p^3$, and $1s2p^4$ configurations of the boron isoelectronic sequence, in terms of the multiconfiguration Dirac-Fock model. Ions with atomic numbers from $Z = 6$ to 54 are included. The generalized Breit interaction, quantum-electrodynamic corrections, and relaxation are taken into account in the calculations of transition energies. Transition rates are computed in intermediate coupling, including configuration interaction within the same complex. It is found that the effects of relativity play a major role in the forbidden transitions, and also become quite important for allowed transitions for $Z \geq 20$. Configuration interaction is found to affect transition rates by as much as a factor of 2 for light ions.

34064 **Lifetime of the 1s2p3d ^{4}F/sub 9/2/ metastable state of Li-like ions.** Chen, M.H.; Crasemann, B. (Lawrence Livermore National Laboratory, Livermore, California 94550). *Physical Review* [*Section*] *A: General Physics;* **35**: No. 11, 4839-4841(1 Jun 1987). Contract W-7405-ENG-48.

The metastable highest-spin ^{4}F/sub 9/2/ state among 1s2p3d configurations of three-electron ions has unique characteristics. The decay rates of this state have been calculated relativistically by the multiconfiguration Dirac-Fock approach for ions with atomic numbers from $Z = 6$ to 42. The major decay channels are found to be Auger transitions made possible by the Breit interaction, as well as

2s-2p and 3p-3d electric dipole, 2s-3d electric quadrupole, and 1s-2p magnetic quadrupole x-ray emission. The Auger rate scales as Z/ sup 4.6/, the 2s-2p/sub 3/2/ E1 radiative decay rate as Z/sup 2.8/, the 2s-3d/sub 5/2/ E2 rate as Z/sup 6.5/, and the 1s-2p/sub 3/2/ rate as Z/sup 8.5/. The differential metastability among the 1s2p3d ^{4}F fine-structure states caused by the effect of relativity is noted.

34065 Spin-orbit and exchange effects in elastic scattering of spin-polarized electrons from spin-polarized Na atoms. McClelland, J.J.; Kelley, M.H.; Celotta, R.J. (Radiation Physics Division, National Bureau of Standards, Gaithersburg, Maryland 20899). *Physical Review Letters;* **58**: No. 21, 2198-2200(25 May 1987).

We report the first measurements of elastic scattering of spin-polarized electrons from spin-polarized Na atoms as a function of scattering angle. The incident energy is 54.4 eV, and the angular range is 20°—135°. Data are presented as an exchange asymmetry and a spin-orbit asymmetry. Each asymmetry has a magnitude of 3% to 4%, indicating that both the exchange and spin-orbit interactions must be taken into account to predict our experimental results.

34066 Laser sustained discharge nozzle apparatus for the production of an intense beam of high kinetic energy atomic species. Cross, J.B.; Cremers, D.A. (to Dept. of Energy). US Patent Application 6-817,934. 10 Jan 1986. 21p. Contract W-7405-ENG-36. DE87007289 NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87007289.

Laser sustained discharge apparatus for the production of intense beams of high kinetic energy atomic species is described. A portion of the plasma resulting from a laser sustained continuous optical discharge which generates energetic atomic species from a gaseous source thereof is expanded through a nozzle into a region of low pressure. The expanded plasma contains a significant concentration of the high kinetic energy atomic species which may be used to investigate the interaction of surfaces therewith. In particular, O-atoms having velocities in excess of 3.5 km/s can be generated for the purpose of studying their interaction with materials in order to develop protective materials for spacecraft which are exposed to such energetic O-atoms during operation in low earth orbit.

34067 An inexpensive way to analyze the optics of electrostatic, surface-ionization ion-source configurations. Balestrini, S.J. (Los Alamos National Lab., Los Alamos, NM 87544). pp 300-301 of Proceedings of the 34th annual conference on mass spectrometry and applied topics. East Lansing, MI; American Society for Mass Spectrometry (1986). (CONF-8606236—).

From 34. annual conference on mass spectrometry and allied topics; Cincinnati, OH, USA (8 Jun 1986).

The optical characteristics of surface ionization sources can often be studied in detail with the aid of a home computer. Sources with two-dimensional symmetry are considered. Ions are created on the surface of a hot filament. An accelerating voltage, V, is applied to the source and filament. The ions are accelerated and focused into a beam by a series of electrodes containing narrow axial slits. The ordering of elementary stages of acceleration that the electrodes form from is the optical stack. The focusing parameters are the fractions of the source voltage applied to the electrodes. A portion of the ions leaves the source through a beam-defining, collimating slit in the final electrode. An ion trajectory at any point along the symmetry axis is described by a vector with two phase space components, which are treated as small quantities. The components at the filament are ω, the displacement from the symmetry axis, and ν, the velocity component of the ion parallel to the filament surface divided by its speed when it leaves the first stage. Elsewhere, the trajectory components are the displacement from the symmetry axis and the slope.

6404 Fluid Physics

34068 (LA-UR—87-439) A method for treating hourglass patterns. Margolin, L.G.; Pyun, J.J. (Lawrence Livermore National Lab., CA (USA); Los Alamos National Lab., NM (USA)). 1987. Contract W-7405-ENG-36. 13p. (CONF-870712—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87006056.

From Numerical methods in laminar and turbulent flow; Montreal, Quebec, Canada (6 Jul 1987).

Hourglassing is a problem frequently encountered in numerical simulations of fluid and solid dynamics. The problem arises because certain volume-preserving distortions of cell shape produce no restoring forces. The result is an unrestricted drifting mode in the velocity field that leads to severe distortions of the computational mesh. These distortions cause large errors in the numerical approximations of the equations of motion. The drift may also allow adjacent vertices to get very close to each other. This results in the computational time step based on a Courant stability condition to become very small, effectively halting the calculation. We describe a mathematical formalism that identifies and selectively damps the hourglass patterns. The damping is constructed to preserve the physical aspects of the solution while maintaining a reasonable computational mesh. We further describe the implementation of our scheme in a 2D hydro code, and show the relative improvement in the results of six different test problems that we calculated.

34069 (LBL—23278) Numerical methods for memory fluids: A critical survey. Keunings, R. (Lawrence Berkeley Lab., CA (USA)). Apr 1987. Contract AC03-76SF00098. 16p. (CONF-870712—3). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009625.

From Numerical methods in laminar and turbulent flow; Montreal, Quebec, Canada (6 Jul 1987).

We summarize our recent review of the state of the art in the numerical analysis of viscoelastic flows. After a description of the mathematical models used in computer simulations, we organize the spectrum of available numerical techniques on the basis of the two approaches of handling the memory of viscoelastic fluids: the coupled approach, where the constitutive model and the conservation laws are solved simultaneously, and the decoupled approach, where the computation of the viscoelastic stresses is done separately from that of the flow kinematics. These two methodologies have been used with both differential and single-integral constitutive models, and in conjunction with various discretization methods. We refer to a number of successful simulations where significant viscoelastic effects have been predicted. Finally, we briefly review the outstanding numerical, mathematical, and modeling problems in the field of viscoelastic flow computations.

34070 Diffeomorphism groups and quantized vortex filaments. Goldin, G.A.; Menikoff, R.; Sharp, D.H. (Departments of Mathematics and Physics, Rutgers University, New Brunswick, New Jersey 08903). *Physical Review Letters;* **58**: No. 21, 2162-2164(25 May 1987).

The quantum hydrodynamics of an incompressible inviscid fluid in R^2 or R^3 is described by means of representations of the group of volume-preserving diffeomorphisms. In R^2 we obtain the surprising result that within the framework of the Euler equations point vortices cannot be consistently quantized, and the encouraging outcome that vortex filaments can be. We also discuss analogs of such configurations in R^3.

6450 High Energy Physics

34071 (FNAL/C—87/48) Asilomar conference on managing complexity in high energy physics: A summary and renaming of the conference. Nash, T. (Fermi National Accelerator Lab., Batavia, IL (USA)). Feb 1987. Contract AC02-76CH03000. 9p. (CONF-870249—5). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87007959.

From Computing high energy physics; Pacific Grove, CA, USA (2 Feb 1987).

The complex aspects of high energy physics work are briefly described, and approaches to managing them are discussed. Management of software and data are covered. For managing complexity in experimental physics, the choice of building or buying processor systems is addressed and the issues of compatibility and standardization are discussed. (LEW)

34072 **(SLAC—306) Proceedings of the second Mark II workshop on SLC physics.** (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). 1986. Contract AC03-76SF00515. 322p. (CONF-8609174—). NTIS, PC A14. File Number DE87010325.

From 2. Mark II workshop on SLC physics; Tahoe City, CA, USA (14 Sep 1986).

Separate abstracts were prepared for 28 papers in these proceedings. (LEW)

34073 **(SLAC—312) Probing the standard model: Proceedings of Summer Institute on Particle Physics.** Brennan, E.C. (ed.). (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). Jan 1987. Contract AC03-76SF00515. 719p. (CONF-860736—). NTIS, PC A99/MF A01; 1; GPO Dep. File Number DE87009268.

From 14. SLAC summer institute on particle physics; Stanford, CA, USA (28 Jul 1986).

Separate abstracts were prepared for 32 papers in these proceedings. (LEW)

6451 Particle Interactions And Properties - Experimental

REFER ALSO TO CITATION(S) 34160, 34412

34074 **(DOE/ER/40315—136) The weak decay of lambda hypernuclei.** Szymanski, J.J. (Carnegie-Mellon Univ., Pittsburgh, PA (USA). Dept. of Physics). Apr 1987. Contract FG02-87ER40315. 171p. NTIS, PC AO8/MF A01; 1; GPO Dep. File Number DE87009764.

Experimental technique and results from a study of the weak decay modes of /sub Λ/^{5}He are presented. The weak decay modes of lambda hypernuclei include the mesonic decays ($\Lambda \rightarrow p + \pi^-$ and $\Lambda \rightarrow n + \pi^0$) and the nonmesonic decay modes ($\Lambda + p \rightarrow n + p$ and $\Lambda + n \rightarrow n + n$) the /sub Λ/^{5}He hypernuclei were produced with the $K^- + {}^6Li \rightarrow \pi^- +$/sub Λ ^6Li $\pi^- + \Lambda$/^{6}Li reaction followed by the strong decay /sub Λ/^{6}Li $\rightarrow$ /sub Λ/^{5}He + p. The incoming K^- momentum was 800 MeV/c and the K-π angle was 10°. The experiment was performed on the Low Energy Separated Beam (LESBI) at the Brookhaven National Laboratory AGS. The protons from the nonmesonic decay branch and the negative pion from the mesonic decay branch were detected in a 14 element scintillator range spectrometer. The neutrons from the nonmesonic decay branch were detected in an 18 element time-of-flight neutron detector array. The partial rates for all four of the decay modes are measured in this experiment. The total decay rate is also measured. The result for the total decay rate is 1.03 +- 0.08 in units of the free lambda decay rate. The results are compared to several calculations of /sub Λ/^{5}He nonmesonic weak decay rates. The results are also compared to /sub Λ/^{12}C weak decay rates previously measured by the CMU-BNL-Houston-New Mexico-Vassar collaboration. 57 refs., 98 figs., 26 tabs.

34075 **(DOE/ER/40315—139) Strange particle physics - today and tomorrow: Conference summary.** Barnes, P.D. (Carnegie-Mellon Univ., Pittsburgh, PA (USA). Dept. of Physics). 1987. Contract FG02-87ER40315. 4p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009766.

Selected new results are briefly reviewed in the context of new direction for strange particle physics.

34076 **(FNAL/C—87/37-E) Charm photoproduction results from the Fermilab Tagged Photon Spectrometer.** Anjos, J.C.; Appel, J.A.; Bracker, S.B.; Browder, T.E.; Cremaldi, L.M.; Elliott, J.R.; Escobar, C.; Estabrooks, P.; Gibney, M.C.; Hartner, G.F. (California Univ., Santa Barbara (USA); Carleton Univ., Ottawa, Ontario (Canada); Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro; Colorado Univ., Boulder (USA); Fermi National Accelerator Lab., Batavia, IL (USA); National Research Council of Canada, Ottawa, Ontario). Feb 1987. Contract AC02-76CH03000. 16p. (CONF-870121—2; CBPF-NF—031/87). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87007960.

From Meeting of the Division of Particles and Fields of the American Physical Society; Salt Lake City, UT, USA (14 Jan 1987).

We report results from a preliminary analysis of approximately 30 million reconstructed events (30% of the data) from E-691, a charm photoproduction experiment conducted at the Fermilab Tagged Photon Laboratory in 1985. We present ratios of antiparticles to particles, p/sub T/^{2} distributions, x/sub F/ distributions, the total charm production cross-section and its energy dependence and the fraction of D°s from D*s.

34077 **(IFVE-ONF—86-95) Neutral strange particle exclusive production in charged current high-energy antineutrino interactions.** Ammosov, V.V.; Gapienko, V.A.; Gapienko, G.S. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1986. 8p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702292.

The cross section of the quasi-elastic reactions nu-bar/sub μ/ p -> $\mu^+ \Lambda(\Sigma^0)$ in the energy range 5-100 GeV is determined from Fermilab 15 bubble chamber antineutrino data. The Q^2-analysis of quasi-elastic Λ-events yields M/sub A/=1.3+-0.3 GeV/c^2 for the axial mass value. With $\mu^+ \Lambda K^0$ events unobserved the 90% confidence level upper limit σ(nu-bar/sub μ/p -> $\mu^+ \Lambda K^0$) < 2.3x10^{-40} cm^2 is obtained. At the same time the cross section of the reaction nu-bar/sub μ/p -> $\mu^+ \Lambda K^0 + m\pi^0$ is equal to (4.5/sub -1.3//sup +1.8/)x10^{-40} cm^2. 14 references, 5 figures.

34078 **(IFVE-ONF—86-117) Coherent production of π-mesons in neutrino and antineutrino interactions on freon nuclei.** Grabosh, G.Yu.; Kaufman, Kh.Kh.; Kreker, U. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1986. 18p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702293.

Submitted to the journal Zeitschrift furPhysic C.

The three components of the isospin triplet in the axial part of the weakly charged and neutral currents have been first observed in one experiment when studying coherent π-meson production in the neutrino and antineutrino interactions with freon nuclei. The following estimations of the corresponding cross sections of the π-meson coherent production: σ/sub coh//sup nu/(π^+)=(106+-16)x10^{-40}, σ/sub coh//sup nu/(π^-)=(113+-35)x10^{-40}, σ/sub coh//sup nu/(π^0)=(52+-19)x10^{-40}. The experimental data are found to be in agreement with the theoretical predictions, based on the standard model of weak interactions. The constant of the isovector axial-vector weak current β=0.99+-0.20 has been defined. 26 references, 12 figures.

34079 **(JINR-D—1-86-422) A-dependence of the production cross section of Λ/sub c/$^+$ charmed baryons in neutron%nucleus interactions. Collaboration BIS-2.** Aleev, A.N.; Aref'ev, V.A.; Balandin, V.P. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1986. 6p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702329.

Submitted to the 23. International Conference on High Energy Physics, Bercley, 1986.

Direct production of charmed baryons Λ/sub c/$^+$ on carbon, aluminium and copper targets has been observed in neutron-nucleus interactions at — 58 GeV. It has been found that an A-dependence of Λ/sub c/$^+$-baryon inclusive production cross section in a kinematical region of 0.5 $\leqq$ x $\leqq$ 1 and P/sub tr/ $\leqq$ 1 GeV/c, fitted as σ(A) — A/sup α/ gives α=0.73+-0.20. This is the first experimen-

tal results on the A-dependence of the charmed baryon production cross section. The experiment has been performed at the 70 GeV Serpukhov accelerator by means of the BIS-2 spectrometer of JINR. 7 references, 5 figures.

34080 **(JINR-E—1-86-332) Size of the proton emission region in pion-xenon interactions at 3.5 GeV/c from two-particle correlations.** Bartke, J.; Kowalski, M.; Grishin, V.G.; Miller, K.; Pluta, J.; Pawlak, T.; Peryt, W.; Strugalski, Z. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1986. 8p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702330.

Correlations between secondary protons with small relative momenta have been studied in interactions of 3.5 GeV/c negative pions with xenon nuclei with the aim to find the radius of the proton emission region. From the total sample of 6301 inelastic interactions, 3879 events with two or more secondary protons were selected. The method for a realistic comparison of experimental two-particle distributions with the theoretical correlation function has been developed which takes into account various uncertainties in the experimental data. The rms radius of the proton emission region has been determined for different selections of events and different momenta of proton pairs. It has been found compatible with the rms radius of the xenon nucleus for fast protons ($p \geqq 0.3$ GeV/c). For slow protons ($0.2 \leqq p < 0.3$ GeV/c) the size of the emisson region seems to be larger than that of the nucleus. 15 references, 6 figures, 1 table.

34081 **(JINR-R—1-86-239) Secondary particle correlations in πp Xe-interaction. Multiplicity distributions.** Pawlak, T.; Peryt, W.; Radomanov, V.B. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1986. 15p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702342.

The results are presented on the study of interaction of relativistic particles with the heavy xenon nucleus at 3.5 GeV/c energy when secondary particles (protons and pions) are emitted in the region kinematically forbidden for the one-nucleons interaction in the nucleus. The multiplicities of the secondary particles are analyzed. The results of the analysis show that the secondary particles are emitted from several centres separated in space and arising successively in time. 32 references, 11 figures.

34082 **(JINR-R—1-86-251) Azimuthal correlations of cumulative hadrons with secondary particles in pC-interactions at 10 GeV/c.** Kopylova, D.K.; Lyubimov, V.B.; Nikitina, V.F.; Togoo, R.; Sherkulov, U.D. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1986. 6p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702344.

The distributions over differences of azimuthal angles of cumulative hadrons (protons and π/sup +-/-mesons) and other secondary particles (protons, π/sup +-/-mesons, leading hadrons) are investigated in the selected cumulative pC-interactions at P/sub p/ =10 GeV/c on the pictures from the 2-meter propane bubble chamber. The emission of cumulative protons correlated on azimuthal angles with protons of every event and with the positive leading particles has been found. Azimuthal correlations of cumulative π/sup +-/-mesons with all considered particles were not found. 11 references, 1 figure, 5 tables.

34083 **(JINR-R—1-86-373) Σ/sup +-/(1385), K/sup *0/ (892) resonances in π^- p-interactions at 16 GeV/c.** Karnaukhov, V.M.; Moroz, V.I.; Koka, C.; Mihul, A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation). 1986. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702347.

The Σ/sup +-/(1385) and K*/sup 0/(892) production cross section from four-prong events with Λ-hyperon in π^-p-interactions at 16 GeV/c are presented: σ/sub Σ(sup +)(1385)/=(47+-10) mb, σ/sub Σ(sup -)(1385)/=(60+-12) mb, σ/sub K*(sup 0)(892)/ =(59+-11) mb. Λ-particles produced as a result of the Σ^+(1385), Σ^-(1385) decay form (13+-3)% and (16+-3)% from total Λ-hyperons, respectively. Different background distributions were compared in order to obtain a better approximation of the resonances. 14 references, 2 figures, 2 tables.

34084 **(JINR-R—1-86-498) Investigation of γ -> 3π chiral anomaly during pion-pair production by pions in the nuclear coulomb field.** Antipov, Yu.M.; Batarin, V.A.; Bezzubov, V.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 19p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702349.

Anomaly vertex γ -> 3π has been experimentally studied in the pion-pair production by pions in the nuclear Coulomb field $\pi^- + (A, Z) \rightarrow \pi^- + \pi^0 (A, Z)$ in the region of low-invariant mass of $\pi^-\pi^0$ system. The experiment was carried out in 400 GeV/c π^- meson beam of IHEP accelerator (Serpukhov) with Sigma spectrometer. The reaction cross section has been measured at $q^2 < 2 \times 10^{-3}$ (GeV/c)^2: $\sigma/Z^2 = (1.63 +- 0.23/\text{sub stat/} +- 0.13/\text{sub syst/})$ nb and vertex constant γ -> 3π : $F^3\pi/ = (12.9 +- 0.9/\text{sub stat/} +- 0.5/\text{sub syst/})$ GeV^{-3} have been measured for the first time. The results agree with the calculation based on Wess-Zumino-Witten effective Lagrangian. A chiral anomaly hypothesis and colour SU(3) quark symmetry are confirmed. 31 references, 9 figures, 4 tables.

34085 **(JINR-R—6-86-476) Estimates of neutrino mass from the electron capture processes.** Vylov, Ts.; Gorozhankin, V.M.; Pokrovskij, V.N.; Rukhadze, N.I.; Vasil'ev, S.K. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1986. 26p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702374.

The principal possibilities of obtaining the estimates of electron neutrino mass from electron capture processes are considered. The analysis of experiments on investigation of decay characteristics of ^{163}Ho, of excited level capture probabilities of ^{158}Tb and of internal bremstrahlung spectra of ^{193}Pt and ^{163}Ho is carried out. Perspectives of these method for obtaining the neutrino mass estimates are discussed. 42 references, 13 figures, 4 tables.

34086 **(LA-UR—87-1196) Limits on the electron-antineutrino mass.** Wilkerson, J.F. (Los Alamos National Lab., NM (USA)). 1987. Contract W-7405-ENG-36. 11p. (CONF-870121—5). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87008990.

From Meeting of the Division of Particles and Fields of the American Physical Society; Salt Lake City, UT, USA (14 Jan 1987).

New measurements near the endpoint of the tritium beta-decay spectrum are producing limits on the electron-antineutrino mass which are below the central mass value of 30 eV reported by ITEP. The factors that influence the neutrino mass sensitivity of tritium beta decay measurements will be discussed followed by a review of the current experimental results. 9 refs., 5 figs., 2 tabs.

34087 **(LA-UR—87-1348) Limit on anti ν/sub e/ mass from free molecular tritium beta decay.** Bowles, T.J.; Browne, J.C.; Helffrich, J.A.; Knapp, D.A.; Maley, M.P.; Robertson, R.G.H.; Cohen, J.S.; Martin, R.L.; Wilkerson, J.F. (Los Alamos National Lab., NM (USA); Lawrence Livermore National Lab., CA (USA); California Univ., San Diego (USA)). 1987. Contract W-7405-ENG-36. 9p. (CONF-870164—3). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009002.

From 7. Moriond workshop: searches for new and exotic phenomena; Les Arcs, France (1 Jan 1987).

The beta spectrum of free molecular tritium has been measured in order to search for a finite electron antineutrino mass. The final-state effects in molecular tritium are accurately known and the data thus yield an essentially model-independent upper limit of 27 eV on the anti ν/sub e/ mass at the 95% confidence level. This limit is dominated by the statistics obtained in the data sets. Optimization of the experimental apparatus is underway and an ultimate sensitivity of 10 eV is expected. 19 refs., 2 figs., 1 tab.

34088 **(UEF—02-86) Proposal for an experiment for studying reactions πin->phip and π^+n->ωp at the HYPERON facility.** Antos, J.; Pastircak, B.; Sandor, L.; Maniev, V.M.; Rusakovich, N.A.; Tsenov, R. (Slovenska Akademia Vied, Kosice (Czechoslovakia). Ustav Experimentalnej Fyziky). Apr 1986. 21p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702406.

A joint experiment is suggested with the Joint Institute for Nuclear Research in Dubna on the HYPERON facility installed on the IHEP accelerator in Serpukhov. The object of the experiment is to study the mechanism of the violation of the Okubo-Zweig-Iizuki rule of quark lines in reactions π^+n->phip and π^+n->ωp. The feasibility of the experiment is demonstrated on existing experimental data at energies of around 10 GeV and on model ideas. (Z.J.).

34089 **(WUB-DI—84-2) Rho/sup 0/ production in the deep inelastic muon-proton scattering.** Hamacher, K. (Wuppertal Univ. (Gesamthochschule) (Germany, F.R.). Fachbereich 8 - Naturwissenschaften 1 - Physik). Aug 1984. 118p. (In German). NTIS (US Sales Only), PC A06/MF A01. File Number DE87751920.

rho/sup 0/-production has been studied in 120, 200 and 280 GeV μp-interactions using events obtained by the EMC forward spectrometer at the CERN SPS. The characteristics of inclusive rho/sup 0/-production have been measured as function of z, p/sub t//sup 2/, Q/sup 2/, W/sup 2/ and the rho/sup 0/-polarisation. In comparison to π/sup 0/-production the ratio of primary rho/sup 0/ to π/sup 0/ production has been determined to be: rho/sup 0//π/sup 0//sub prim/. = 0,9 +- 0,35 (stat.) + 0,35 - 0,3 (syst.) Exclusive rho/sup 0/-production has been measured for the first time in the deep inelastic region (1 $\leqq$ Q/sup 2/ $\leqq$ 25 GeV/sup 2/). The rho/sup 0/-production shows typical features of a hard scattering process, especially a shallow t-distribution and a dominantly longitudinal polarisation of the produced rho/sup 0/. The rho/sup 0/ are mainly produced by transversely polarised photons. The cross-section for virtual photoproduction falls off as 1/Q/sup 4/. S-channel-helicity-conservation is invalid at high Q/sup 2/, diffractive vector-dominance-models cannot describe the data.

34090 **Production of strange baryons in e^+e^- annihilations at 29 GeV.** Abachi, S.; Baringer, P.; Bylsma, B.G.; DeBonte, R.; Koltick, D.; Low, E.H.; McIlwain, R.L.; Miller, D.H.; Ng, C.R.; Shibata, E.I. (Purdue University, W. Lafayette, Indiana 47907). *Physical Review Letters;* **58**: No. 25, 2627-2630(22 Jun 1987).

The production of strange baryons Σ/sup +- / (1385) and γ^- has been observed in e^+e^- annihilations at 29 GeV center-of-mass energy, by use of data obtained with the High Resolution Spectrometer at the SLAC storage ring PEP. The total mean multiplicities are measured to be <n/sub Σ//sup +- /(1385)> = 0.033 +- 0.006 +- 0.005 and <n/sub γ//sub =/> = 0.016 +- 0.004 +- 0.004 per hadronic event. The results are in good agreement with the Lund string model.

34091 **Neutrino mass limits from SN1987A.** Arnett, W.D.; Rosner, J.L. (Enrico Fermi Institute and Department of Astronomy and Physics, University of Chicago, Chicago, Illinois 60637). *Physical Review Letters;* **58**: No. 18, 1906-1909(4 May 1987).

A neutrino signal from the supernova SN1987A is used to place an upper limit on the neutrino mass. If most of the neutrinos must have been emitted within several seconds, as suggested by astrophysical models, the last three of the eleven events observed by the Kamioka detector must correspond to noise or to the tail of a distribution in emission times. If the remaining eight events (which arrived within two seconds of one another) are due to neutrinos emitted within four seconds (a conservative upper limit), bound m/sub ν//sub >//sub e//sub =/ $\leqq$ 12 eV/c^2 is obtained. The Irvine-Michigan-Brookhaven data, with a higher energy threshold, primarily provide information regarding the total duration of the burst.

34092 **Signatures of supersymmetry at the CERN Collider.** Haber, H.E. (Santa Cruz Institute for Particle Physics, Univ. of California, Santa Cruz, CA 95064). pp 128-155 of New particles 1985. Barger, V.; Cline, D.; Halzen, F. Philadelphia, PA; World Scientific Pub. Co. (1986).

A comprehensive analysis of missing energy events at the CERN Collider which would arise from a supersymmetric theory is presented. The rates for gluino and scalar-quark production are computed subject to the new 1984 UA1 cuts, triggers and resolutions. Using the newly reported 1984 data, it is argued that the monojet events are highly unlikely to come from supersymmetric particle production.

34093 **ASP: A search for single photon events at PEP.** Hollebeek, R. (Stanford Linear Accelerator Center, Stanford Univ., Stanford, CA 94305). pp 162-184 of New particles 1985. Barger, V.; Cline, D.; Halzen, F. Philadelphia, PA; World Scientific Pub. Co. (1986). Contract AC03-76SF00515.

The ASP search for events with a single photon and no other observed particles is reviewed. New results on the number of neutrino generations and limits on selectron, photino, squark and gluino masses are presented.

6452 Particle Interactions And Properties - Theoretical

REFER ALSO TO CITATION(S) 34120, 34132

34094 **(CEA-CONF—8777) Chiral symmetry and strangeness.** Rho, M. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Inst. de Recherche Fondamentale (IRF)). Sep 1986. 19p. (CEA-SPhT—86-147; CONF-8609163—10). NTIS (US Sales Only), PC A02/MF A01. File Number DE87751812.

From International conference and symposia on unified concepts of many-body problems; Stony Brook, NY, USA (4 Sep 1986).

In this paper, I will discuss the subsequent developments on the chiral bag and then turn to the most recent work the role of chiral symmetry in strange baryons.

34095 **(CRN-HE—85-02) Low energy constraints on supergravity parameters.** Bouquet, A.; Kaplan, J.; Savoy, C.A. (Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires). 1985. 47p. NTIS (US Sales Only), PC A03/MF A01. File Number DE87751823.

We make a careful analysis of the constraints on supergravity parameters from the requirement of SU(2) x U(1) symmetry breaking. Since we obtain fully analytic solutions to the relevant renormalization group equations, we are able to explore the whole range of parameters. Breaking electroweak symmetry with a light top quark leads to a strong correlation between the dimensionless parameters and the mass ratios in the supergravity Lagrangian. However, the overall mass scale, e.g. m/sub 3/2/, is not fixed by this requirement. The bound on the lightest neutral Higgs boson is reexamined. The lightest squark is usually a stop, but we easily find cases where it is a bottom. Unfortunately the low energy constraints provide no useful guidelines for experimentalists.

34096 **(CRN-HE—85-05) Right handed neutrinos in scalar leptonic interactions.** Fleury, N.; Leite Lopes, J.; Barroso, M.; Magalhaes, M.E.; Martins Simoes, J.A. (Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires). 1985. 9p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87751825.

In this note we propose that right handed neutrinos can behave as singlets. Their interaction properties could be revealed through scalar couplings. Signatures and branching ratios for this hypothesis are discussed. In particular we discuss angular asymmetries in ν/sub μ/e -> ν/sub e/μ due to scalar exchange and z/sup 0/ decay in two scalars.

34097 **(CRN-HE—86-02) Unification of forces in physics: the first attempts.** Leite Lopes, J. (Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires). 1986. 11p. (In French). NTIS (US Sales Only), PC A02/MF A01. File Number DE87751820.

This report reviews the development of the standard model of the unification of the weak and magnetic forces due to Weinberg, Glashow and Salam's works, but also to some trials which preceded them and contributed to reveal the fundamental ideas of this theory.

34098 **(JINR-E—2-86-355) Consideration of the vacuum of QCD in a composite quark model. Strange hadrons.** Dorokhov, A.E.; Kochelev, N.I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 10p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702333.

The method of inclusion of QCD vacuum condensates within the quark composite model is generalized to the case of hadrons containing strange quarks. The mass formula for such hadrons is obtained. The mass of strange quark is defined by analysing the energy spectrum of hadron ground states. The mixing angles of pseudoscalar mesons are estimated. 16 references, 1 figure, 3 tables.

34099 **(JINR-R—2-86-307) Anomalies in radiation decays of charmed mesons.** Kalinovskij, Yu.L.; Pervushin, V.N.; Sarikov, N.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702354.

The amplitudes of the charmed meson decays D->0^- +0^- + γ and F->0^- +0^- +γ are calculated in the framework of the SU(4)xSU(4)-chiral Lagrangians with account for anomalies. It is shown that in this approach no E1-transition exists. 14 references, 1 figure, 2 tables.

34100 **(JINR-R—2-86-399) $\pi\pi$ and KK-bar scattering and scalar mesons.** Krupa, D.; Meshcheryakov, V.A.; Surovtsev, Yu. S. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 12p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702356.

In a two-channel unitarity approximation the use of analytic properties of s- wave $\pi\pi$ and KK-bar scattering amplitudes and certain assumptions on the KK-bar-scattering background allow one to describe the s- wave of the $\pi\pi$ -> KK-bar process on the basis of $\pi\pi$ scattering data analysis. A 4-sheet structure of the Riemann surface of the considered amplitudes is taken into account by means of a proper model of this surface uniformizing these amplitudes. The coupling constants of S*(980)-meson with $\pi\pi$ and KK-bar system are evaluated: g/sub $\pi\pi$S(sup *)//g/sub KK-barS(sup *)/ — 0.5. 20 references, 4 figures.

34101 **(JINR-R—2-86-401) K/sub L,S/ -> l^+l^- decays in quark loop chiral model.** Volkov, M.K.; Ivanov, A.N.; Troitskaya, N.I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 14p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702357.

Submittd to the journal Z. Phys., C.

The probabilities of K/sub L,S/ -> l^+l^- decays are calculated. Only the dominant two-lepton K/sub L,S/ -> $\gamma^*\gamma^*$ -> l^+l^- channel is considered. It is shown that the K^0 -> X transitions dominate in the K/sub L,S/ -> $\gamma^*\gamma^*$ decay amplitudes, where X are either the π^0, eta, eta' pseudoscalar mesons or the ϵ(700) scalar Lagrangian, obtained in the standard model of Kobayashi-Maskawa with the account of the QCD-interaction is used. The weak vertices of K^0 -> X transitions are defined by four-quark operators Q/sub 1,2,3,5,6/, where Q_8 is the so-called Penguin operator. The matrix elements of Q-operators are calculated in the Chiral Quark-Loop (CQL) Model. The leading contribution to matrix elements of K^0->X transitions comes from the Penguin operator matrix elements. In the CQL-model the Q-operator low-energy matrix elements can be expressed in terms of four parameters: the cut-off parameter Λ=1.25 GeV, m/sub u/=0.28 GeV, m/sub s/=0.46 GeV and μ=0.24 GeV, where m/sub u/ and m/sub s/ are the masses of u and s constituent quarks, and μ is a normalization point related to the QCD-coupling constant a/sub s/(μ). 22 references, 4 figures, 2 tables.

34102 **(JINR-R—2-86-421) Chiral phi^4-lagrangians and eta/sup '/ -> $eta^2\pi$ decay amplitude.** Bel'kov, A.A.; Pervushin, V.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 4p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702359.

Submitted to the journal Yad. Fiz.

The amplitude of eta' -> eta2π decay is calculated in the framework of the chiral Lagrangian obtained in low-energy QCD. It is shown that the experimental research of the decay gives a unique possibility to determine the low-energy QCD-expansion parameters. 12 references.

34103 **(JINR-R—2-86-426) K/sub L/ and K/sub S/ meson mass difference in the chiral quark-loop model.** Volkov, M.K.; Ivanov, A.N.; Troitskaya, N.I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702361.

Submitted to the journal Phys. Lett.

The calculation is carried out of the low-energy (the long-distance) contribution to the K/sub L/-K/sub S/ mass difference; ΔM/sub (LD)/=1,45x10^{-15} GeV. For describing weak interaction one employs the effective Lagrangian obtained in the Standard Kobayashi-Maskawa Model with account of the QCD-interaction. The weak vertices in the effective Lagrangian are defined by four-quark operators. For the calculation of the low-energy four-quark operator matrix elements one applied the chiral quark-loop model (the CQL-model). In the CQL-model all the low-energy four-quark matrix elements can be expressed in terms of only three parameters; Λ=1,25 GeV, m/sub d/=m/sub u/=0,28 GeV and m/sub s/ =0,46 GeV, where Λ is the cut-off parameter, and m/sub d/, m/sub u/, m/sub s/ are the d, u, s-constituent quark masses. The estimate of high energy interactions (the short-distance) contribution to K/sub L/-K/sub L/ mass difference ΔM/sub (SD)/ is made. The lattest is ill known, because it contains such indefinite parameters as t-quark mass m/sub t/ and KM angle mixing. Θ_3. These parameters are the KM-Standard Model and cannot be defined in the CQL-model. 17 references, 1 figure.

34104 **(JINR-R—4-86-397) Analytic models of pion form factor.** Bykovskij, B.V.; Meshcheryakov, V.A.; Furdik, I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702366.

An analytic Gounaris-Sakurai-like model with three parameters is considered. The pion form factor has an infinite-sheeted Riemann surface. The left cut of unphysical sheets is associated with the crossing-cut of p-wave of $\pi\pi$ scattering amplitude. A new parametrization of the model is proposed which is in better agreement with the experimental data. All parameters are physically clear. 14 references, 1 figure, 1 table.

34105 **(LA-UR—87-1255) Magninos: Experimental consequences and constraints.** Raby, S.; West, G.B. (Los Alamos National Lab., NM (USA)). 1987. Contract W-7405-ENG-36. 27p. (CONF-8704107—1). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87008995.

From Telemark IV; Ashland, WI, USA (23 Apr 1987).

A stable weakly interacting massive particle can simultaneously solve both the solar neutrino and missing mass problems. We have identified this particle with a neutral lepton with mass of order 5 to 15 GeV and an anomalous magnetic moment of order 10^{-2} (in the natural units). We call this new particle a [magnino]. In one scenario, the magnino is the neutral component of an electroweak doublet. It has a charged partner with mass a few GeV heavier. In this talk the experimental consequences of the magnino, its charged partner and associated Higgs are discussed. 25 refs., 9 figs.

34106 **(LAPP-TH—157) R-parity breaking and cosmological consequences.** Bouquet, A.; Salati, P. (Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules). Feb 1986. 29p. (PAR-LPTHE—86-09). NTIS (US Sales Only), PC A03/MF A01. File Number DE87752076.

The breaking of R-parity allows the lightest supersymmetric particle (LSP) to decay, and we study the cosmological bounds on its mass and lifetime. These bounds can be translated into a lower limit on the neutrino mass when R-parity is broken by a nonzero scalar neutrino v.e.v., and into lower limits on the symmetry breaking parameters when R-parity is broken by explicit couplings in the lagrangian.

34107 **(LBL—22841) Probing electroweak symmetry breaking at the SSC [Superconducting Super Collider]: A no-lose corollary.** Chanowitz, M.S. (Lawrence Berkeley Lab., CA (USA)). 11 Feb 1987. Contract AC03-76SF00098. 15p. (CONF-870121—1). NTIS MF A01; 2; GPO Dep. File Number DE87007610.

From Meeting of the Division of Particles and Fields of the American Physical Society; Salt Lake City, UT, USA (14 Jan 1987).

Low energy theorems are derived for scattering of longitudinally polarized W and Z's, providing the basis for an estimate of the observable signal at the SSC if electroweak symmetry breaking is due to new physics at the TeV scale.

34108 **(SLAC-PUB—4253) Phenomenology of heavy quark systems.** Gilman, F.J. (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). Mar 1987. Contract AC03-76SF00515. 31p. (CONF-860736—14). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87008325.

From 14. SLAC summer institute on particle physics; Stanford, CA, USA (28 Jul 1986).

The spectroscopy of heavy quark systems is examined with regards to spin independent and spin dependent potentials. It is shown that a qualitative picture exists of the spin-independent forces, and that a semi-quantitative understanding exists for the spin-dependent effects. A brief review is then given of the subject of the decays of hadrons containing heavy quarks, including weak decays at the quark level, and describing corrections to the spectator model. (LEW)

34109 **(UWThPh—1986-35) New crucial tests of compositeness of the third and a possible fourth family in e^+e^- colliders. Physics Publication 87-135.** Pati, J.C.; Stremnitzer, H. (Vienna Univ. (Austria). Inst. fuer Theoretische Physik). Feb 1987. 12p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702408.

Assuming that quarks and Higgs are composite, it has been argued that the compositeness scale of at least the heaviest - i.e. the third and/or a possible fourth family - should be nearly 1 TeV. We point out that in particular the reaction toponium -> bb-bar as well as single top decay would provide crucial tests of such compositeness. Other reactions of importance to LEP I, SLC as well as LEP 200 are noted.

34110 **(UWThPh—1987-2) Right handed charged currents induced by a strongly interacting Higgs sector.** Neufeld, H. (Vienna Univ. (Austria). Inst. fuer Theoretische Physik). 1987. 34p. NTIS (US Sales Only), PC A03/MF A01. File Number DE87702410.

A strongly interacting Higgs sector could give rise to right handed charged currents in the quark sector. An analysis of nonleptonic weak K decays strongly restricts the possible size of these right handed couplings. The experimental value of ϵ can be reproduced even for vanishing R-bar = Γ (b -> uenu)/Γ(b -> cenu). ϵ'/ϵ may have arbitrarily small values of either sign. The neutron electric dipole moment could be near to its present experimental bound.

34111 **Detecting gluinos at hadron supercolliders.** Baer, H.; Barger, V.; Karatas, D.; Tata, X. (High Energy Physics Division, Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review [Section] D: Particles and Fields;* **36**: No. 1, 96-108(1 Jul 1987).

If the gluino mass exceeds 150—200 GeV, searches for gluinos will likely have to be made at multi-TeV hadron colliders. Unlike the case of light gluinos (m approx. <60 GeV), which dominantly decay via g-tilde→qq-bargamma-tilde, heavy-gluino decays proceed via g-tilde→qq-barW-tilde/sub i/ and g-tilde→qq-barZ-tilde/sub j/ where W-tilde/sub i/ and Z-tilde/sub j/ are charged and neutral mass eigenstates in the gauge-Higgs-fermion sector. The usual missing-p/sub T/ signatures are altered and new strategies may be required for gluino detection. We analyze heavy-gluino and scalar-quark decays and estimate the production rates for W-tilde/sub i/W-tilde/sub j/, W-tilde/sub i/Z-tilde/sub j/, and Z-tilde/sub i/Z-tilde/sub j/ pairs at a 40-TeV pp collider. Since a heavy gluino decays dominantly into jets and the heavy chargino, which in turn decays into a Z^0 or W boson plus a lighter chargino or neutralino, a typical gluino-pair event contains several leptons and/or jets in the final state.

34112 **How reliable are neutrino mass limits derived from SN1987A?.** Kolb, E.W.; Stebbins, A.J.; Turner, M.S. (NASA/Fermilab Astrophysics Center, Fermi National Accelerator Laboratory, Batavia, Illinois 60510-0500). *Physical Review [Section] D: Particles and Fields;* **35**: No. 12, 3598-3606(15 Jun 1987).

We examine in detail the model-independent limits on the electron-neutrino mass which follow from a dispersion analysis of the 2-sec neutrino pulse from SN1987A detected by Kamiokande II (KII). When experimental realities are taken into account, we conclude that no reliable constraint better than the current laboratory limits (i.e., better than order 20 eV) can be obtained. In fact, when all 11 events in the 12.4-sec KII pulse and the 8 IMB events are considered, a 20-eV or so neutrino mass might actually diminish the inferred duration of the burst at the source.

34113 **Exotic quark-gluon hybrid at 1420 MeV.** Chanowitz, M.S. (Lawrence Berkeley Lab., CA, USA). *Physics Letters [Section] B;* **187**: No. 3/4, 409-414(26 Mar 1987). Contract AC03-76SF00098.

Puzzling experimental observations in photon-photon scattering and hadronic psi decay may be explained by the existence of an exotic J/sup PC/ = 1/sup -+/ meson. This hypothesis is easily confirmed or refuted by experimental studies of the decay angular distributions for $\gamma\gamma$/sup */ -> anti KKπ and psi -> ωanti KKπ. If confirmed the new meson would be most readily interpreted as a mixed state of quarks and gluons.

34114 **Distinctive signatures for new particles in e/sup +/e/sup -/ annihilation and Z-decay.** Tung, W.K.; Kitazawa, Y. (Enrico Fermi Institute, Univ. of Chicago, Chicago, IL). pp 67-81 of New particles 1985. Barger, V.; Cline, D.; Halzen, F. Philadelphia, PA; World Scientific Pub. Co. (1986).

New particles and new interactions reveal themselves most clearly where standard model contributions are negligibly small. A prominent example with this advantage is the one-lepton inclusive longitudinal structure function (W/sub L/) in e/sup +/e/sup -/ annihilation and Z-decay. The authors discuss general features of this approach and present structure functions for four types of new particles (heavy charged fermion (e.g., new sequential lepton or top quark); heavy neutral lepton; and supersymmetric scalar lepton, i.e. slepton), along with the (small) standard model 'background'. The x-dependence of W/sub L/ provides a distinct signature of the identity of the new particle. Extensions of this approach are discussed.

34115 **Interacting-string picture of the Neveu-Schwarz-Ramond model.** Mandelstam, S. (Dept. of Physics and Lawrence Berkeley Lab., Univ. of California, Berkeley, CA 94720). pp 610-639 of Superstrings: The first 15 years of superstring theory. Schwarz, J.H. Philadelphia, PA; World Scientific Pub. Co. (1985).

The interacting-string picture is extended to the Neveu-Schwarz and Ramond models. The picture is manifestly dual, even for the Ramond model, and amplitudes with an arbitrary number of external fermions can be constructed. In all channels the only singularities are poles corresponding to the expected particles. There

exist both qq-bar and zero-quark mesons, which differ in the parity of the states with odd Neveu-Schwarz g-parity. Calculations of ff-bar scattering amplitudes are performed. The results are β-functions multiplied by simple kinematical factors, and it is easily verified that the amplitudes possess all the necessary properties.

34116 **Aspects of meson-Skyrmion scattering.** Mattis, M.P. (Stanford Linear Accelerator Center, Stanford Univ., Stanford, CA 94305). pp 432-453 of Workshop on nuclear chromodynamics: Quarks and gluons in particles and nuclei. Brodsky, S.; Moniz, E. Philadelphia, PA; World Scientific Pub. Co. (1985). (CONF-8508127—). Contract AC03-76SF00515.

From Nuclear chromodynamics: quarks and gluons in particles and nuclei; Santa Barbara, CA, USA (12 Aug 1985).

Model-dependent and model-independent results for $\pi N \rightarrow \pi N$ and $\pi \rightarrow \pi\Delta$ in the Skyrme model are reviewed. An extension of the formalism to the 3-flavor case is presented.

6453 Particle Invariance Principles And Symmetries

REFER ALSO TO CITATION(S) 34094, 34106, 34115, 34134, 34135, 34136, 34137, 34138, 34139, 34140, 34141, 34142, 34143

34117 **(LA-UR—87-1104) Theoretical expectations for T-violation in the nucleon-nucleon interaction.** Herczeg, P. (Los Alamos National Lab., NM (USA)). 1987. Contract W-7405-ENG-36. 9p. (CONF-870164—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87007504.

From 7. Moriond workshop: searches for new and exotic phenomena; Les Arcs, France (1 Jan 1987).

The possible size of T-violating effects in the N-N interaction are considered both with and without P-violation. For T-violation it is found that in several gauge models P,T-violating effects in the N-N interaction could be large enough to be observable in some current and contemplated experiments. Concerning P-conserving T-violating effects it is noted that in gauge models with elementary quarks the flavor-conserving nonleptonic interactions of the quarks do not contain in first order a P-conserving T-violating component. (DWL)

34118 **(LAPP-TH—146) Representations of the superalgebra F/sub 4/ and Young supertableaux.** Sciarrino, A.; Sorba, P. (Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules). Oct 1985. 14p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87751808.

We present a method for constructing typical as well as atypical finite dimensional representations of the superalgebra F/sub 4/. For such a purpose, Young supertableaux are introduced.

34119 **Spinning string theory from a modern perspective.** Schwarz, J.H. (California Institute of Technology, Pasadena, CA). pp 227-244 of Superstrings: The first 15 years of superstring theory. Schwarz, J.H. Philadelphia, PA; World Scientific Pub. Co. (1985).

The spinning string theory can be regarded as a locally supersymmetric theory in a superspace with ten Bose and sixteen Fermi dimensions. By making six of the Bose dimensions compact in a space of suitable topology, a four-dimensional theory with N=4 extended supersymmetry is obtained. The possibility that such a scheme could provide a unified description of all interactions is discussed.

6454 Field Theory

REFER ALSO TO CITATION(S) 34097, 34098, 34119, 34205, 34208, 34212, 34237, 34238, 34239

34120 **(CEA-CONF—8776) Asymptotic completeness and multiparticle analysis in field theories.** Iagolnitzer, D. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Inst. de Recherche Fondamentale (IRF)). Jul 1986. 7p. (CONF-860761—2). NTIS (US Sales Only), PC A02/MF A01. File Number DE87751810.

From 8. international conference on mathematical physics; Marseilles, France (16 Jul 1986).

Previous proofs of asymptotic completeness and related results on scattering in field theories are restricted to P(phi)/sub 2/ models in the 2 and 3-particle regions. This talk reports recent works, which involve new ideas and methods and provide more direct proofs and some generalization of these results: (i) extensions to theories with renormalization such as phi/sub 3//sup 4/ and the Gross-Neveu model and (ii) equations closely linked with asymptotic completeness and multiparticle structure in general energy regions.

34121 **(IFVE-OTF—86-46) Tensor structure of gluon polarization operator in the axial gauge in the infrared region.** Alekseev, A.I.; Edneral, V.F. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1986. 15p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702294.

Submitted to the journal Sov. J. Nucl. Phys.

In the framework of the pure gluodynamics the tensor structure of one- and two-loop terms is obtained for the gluon polarization operator in the axial gauge. For the gluon propagator having infrared asymptotics the one-loop tensor term is calculated taking into account the transverse part of the three-gluon vertex function. It is shown that two-loop term can not be omitted in the tensor Schwinger-Dyson equation in the infrared region. 12 references.

34122 **(IFVE-OTF—86-150) Particular solutions of the equation for quark propagator in the infrared region of QCD.** Arbuzov, B.A.; Davydychev, A.I.; Kurennoj, S.S. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1986. 20p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702295.

Submitted to the journal Nuovo Cimento.

A number of particular solutions of the Schwinger-Dyson equation for the quark propagator in the infrared region of QCD is obtained taking account of the gauge identities. The solutions are of a nonperturbative character, some of them break the chiral invariance. The obtained solutions are analysed with the help of the effective potential method. 21 references, 3 figures.

34123 (INIS-mf—10902, pp 1) **Work in quantum electrodynamics and field physics.** Ledinegg, E. Dec 1986. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702298.

In Annual report (October 1985 - September 1986).

34124 **(ITEF—56(1986)) Perturbation theory for the problem of metastable vacuum decay.** Kiselev, V.G.; Kobzarev, I.Yu. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). 1986. 30p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702312.

In phi^4 theory in (I+I) dimensional space with two nondegenerated vacua first corrections for E to the probability of metastable vacuum deca were calculated in the limit of small difference of their energy E. It is clearly demonstrated that E^2 is a decay parameter. Logarithmic theory of perturbations was used to find the Jost function of the Schroedinger equation. 17 references.

34125 **(ITEP—87(1986)) Operator expansion in σ-model.** Terent'ev, M.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). 1986. 24p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702320.

The operator expansion is studied in two dimensional σ-model with O(N) symmetry group at large values of N for the Green function $<n(0)n(x)>$ at $x^2 \rightarrow 0$ (Here n(x) is the dynamical field of σ-model). As a preliminary step the renormalization scheme is formulated in framework of I/N expansion where the intermediate scale μ^2 is introdused and regions of large ($p > \mu$) and small ($p < \mu$) euclidean virtual momenta are factorized. It is shown that the definition of composite operators and coefficient functions in the

operator expansion may be realized unabliguously in the leading order in I/N expansion. In the next order the corrections of order of $f(\mu^2)/N$ in composite operators (here $f(\mu^2)$ is the effective coupling constant at the point μ^2) and the corrections of order of $m^2x^2f(\mu^2)/N$ in the coefficient functions (here m is the dynamical mass-scale factor of σ-model) decisively depend on the recipe of factorization of small and large momenta regions. Due to the analogy between σ-model and quantum chromodynamics (QCD) the obtained result indicates the theoretical limitations to the accuracy of sum rule method in QCD. 19 references, 6 figures.

34126 **(JINR-E—2-86-316) QCD: a new view on an old problem.** Kalinovskij, Yu.L.; Pervushin, V.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 10p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702332.

Submitted to 8. International Seminar on High Energy Physics Problems, Dubna, 19-24 June, 1986.

During the last ten years the renormalization group idea of asymptotic freedom has been dominating in QCD. The 1984 - theoretical revolution led to consistent unification theories without ultraviolet divergences where the renormalization equations became identities and lost their physical meaning. Here QCD is considered as a part of such a consistent theory and a new mechanism is proposed of the dimensional transmutation based on the collective excitation of infrared fields that are usually omitted in the canonical quantization. It is shown that the quantization of the infrared fields leads to one of the versions of the confinement propagator. 16 references.

34127 **(JINR-E—2-86-425) Counterterm $\delta L=-1/2M^2A/$ sub $\mu/^2$ in the Langrangian of Euclidian quantum electrodynamics and the qauge invariance.** Zastavenko, L.G. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 6p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702334.

Submitted to the journal Teor. Mat. Fiz.

The quadratic divergence of the inverse photon propagator in QED comples one to introduce the counterterm δzeta=-1/2 A/ sub $\mu/^2M^2$ into the Lagrangian. The work contains a simple proof that such an introduction does not break the gauge invariance of Euclidean QED. The gauge non-invariant part of zeta describes some non-interacting particle. The Feynman path integral formulation of QED is used. 4 references.

34128 **(JINR-E—2-86-460) Interrelation of different renormalization groups.** Shirkov, D.V.; Shumovskij, A.S.; Yukalov, V.I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 11p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702336.

The functional self-similarity property of a number of physical systems is considered. Different formulations of renormalization group and semigroup transformation are analysed. Their general and particular properties are discussed. From the mathematical point of view a renormalization group can be introduced by two ways. One is based on the elucidation of an internal symmetry of a concrete physical system and on the description of the symmetry given using the language of variables that are natural for the problem considered. Such a method of constructing renormalization groups has been used by Stueckelberg and Petermann and by Bogolubov and Shirkov. The other way is connected with the separation of a class of models that have similar properties and differ one from another by the scale of some variable. This method is illustrated by the approaches due to Gell-Mann and Low, Kadanoff and Wilson, and Yukhnovsky. Both the ways mentioned are particular consequences of the general principle of the functional self-similarity. 30 references.

34129 **(JINR-R—2-86-33) Spinor-spinor quasipotential in quantum electrodynamics.** Desimirov, G.M. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 10p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702350.

Submitted to the journal Teor. Mat. Fiz.

In the case of two interacting spinor fields with equal masses, using the Lorentz type relativistic covariant gauges the first version of the Logunov-Tavkhelidze quasipotential approach is applied. The second order terms in the perturbation theory are obtained, and the quasipotentials in Dirac four-component and in Pauli two-component form are computed. The low-energy limit of the two-component form of the quasipotentials is calculated. In the case of Landau gauge and in the Fried-Yennie gauge the reconstruction of the full structure of the Breit potential is obtained. 17 references.

34130 **(JINR-R—2-86-317) Asymptotics of soliton mass in the modified Skyrme model.** Inozemtsev, V.I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 6p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702355.

The leading term in the asymptotics of spherically symmetric soliton mass in the modified Skyrme model for large values of topological charge identified with baryon number N_B is considered. It is shown that this term has the form CxN. The dependence of the coefficient C on the parameters of the model is investigated. 8 references, 2 figures.

34131 **(JINR-R—2-86-423) Okum's razor for gauge theories.** Ilieva, N.P.; Pervushin, V.P.; Kalinovskij, Yu.L.; Nguen Suan Khan. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 13p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702360.

Submitted to the journal Zeitschrift fur Physik. Ser. C: Particles and fields.

A minimal version of the canonical quantization of gauge theories at each step of which the gauge and relativistic invariances are conserved is proposed. The corresponding Faddeev - Popov integral is constructed that leads to a relativistic-covariant fermion Green's function with correct analytical properties. It is shown that in the minimal quantization framework a unique solution of the chiral Schwinger model is possible and the gauge ambiguity problem reduces to the topological degeneration of the physical variables. A new mechanism of infrared dimensional transmutation in QCD is considered that is omitted in the conventional quantization scheme. 17 references.

34132 **(JINR-R—4-86-515) Rotational bands in nonstrange dibaryon mass spectrum.** Nikolaev, V.A.; Tkachev, O.G. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 6p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702369.

The effective quantum Hamiltonian for nonstrange dibaryons in SU(2) Skyrme model is deduced. The rotations and vibrations of skyrmion are taken into account. The ansatz where the additional winding number of the fields is obtained by dubling the twist in the isovector fields rather than in the chiral angle is used. The baryon density and mass spectra are calculated for the states with isospin equal to two units. 4 references, 2 figures.

34133 **Logarithmic approximations to polynomial Lagrangians.** Bender, C.M.; Milton, K.A.; Moshe, M.; Pinsky, S.S.; Simmons, L.M. Jr. (Department of Physics, Imperial College London, London SW7 2BZ, United Kingdom). *Physical Review Letters;* **58**: No. 25, 2615-2618(22 Jun 1987).

A new perturbative computational scheme for solving quantum field theory is proposed. The interaction term in the Lagrangean is expanded about a free-theory form, the expansion involving powers of logarithms of the fields. The resulting perturbation series appears to have a finite radius of convergence and numerical results for simple models are good.

34134 **SU(5)/sub L/xSU(5)/sub R/ hybrid unification.** Davidson, A.; Wali, K.C. (Physics Department, Syracuse University, Syracuse, New York 13244-1130). *Physical Review Letters;* **58**: No. 25, 2623-2626(22 Jun 1987).

Flavor chirality is combined with genuine left-right symmetry in a unified SU(5)/sub L/xSU(5)/sub R/ manner. An SU(2)/sub L/xSU(2)/sub R/-singlet fermionic companion to each quark and lepton is predicted; the associated seesaw mechanism is examined in

the light of proton stability. The evolution of sin²θ/sub W/ exhibits distinctive features: (i) It starts at (3/16 and rises, and (ii) it is N dependent (N being the total number of generations). N = 3,4 dictates an intermediate mass scale —10^7 GeV, marking the breakdown of SU(5)/sub R/.

34135 **Superstring interactions.** Green, M.B.; Schwarz, J.H. (California Institute of Technology, Pasadena, CA 91125). pp 763-808 of Superstrings: The first 15 years of superstring theory. Schwarz, J.H. Philadelphia, PA; World Scientific Pub. Co. (1985).

As a first step in the construction of a superstring field theory, the off-shelf vertex for coupling three arbitrary open superstring states is constructed. A cubic interaction term in the supersymmetry charge is also obtained. Since the Hamiltonian corresponds to the square of this supercharge, certain quartic interactions can be deduced as well. It appears likely, however, that the complete field theory of superstrings contains quartic and higher interactions in addition to those obtained here.

34136 **Superfield theory of type (II) superstrings.** Green, M.B.; Schwarz, J.H. (California Institute of Technology, Pasadena, CA 91125). pp 809-850 of Superstrings: The first 15 years of superstring theory. Schwarz, J.H. Philadelphia, PA; World Scientific Pub. Co. (1985).

Type (II) superstrings are described by light-cone superfields that are functionals of string superspace coordinates. The interaction hamiltonian and supersymmetry charges are determined to first order in the coupling constant by requiring invariance under the super-Poincare algebra. In a suitable low-energy limit the formalism goes smoothly into that of extended supergravity in ten dimensions.

34137 **Superstring field theory.** Green, M.B.; Schwarz, J.H. (Physics Dept., Queen Mary College, Univ. of London, London E1 4NS). pp 851-912 of Superstrings: The first 15 years of superstring theory. Schwarz, J.H. Philadelphia, PA; World Scientific Pub. Co. (1985).

Superstring field theories are formulated in terms of light-cone-gauge superfields that are functionals of string coordinates. The formalism used preserves only the manifest SU(4) symmetry that corresponds to rotations among six of the eight transverse directions. In type I theories, which have one ten-dimensional supersymmetry and describe both open and closed strings, there are five interaction terms of two basic kinds. One kind is a breaking or joining interaction, which is a string generalization of a cubic Yang-Mills coupling. It is relevant to both the three open-string vertex and the open-string to closed-string transition vertex. The other kind is an exchange or crossing-over interaction, which is a string generalization of a cubic gravitational coupling. All the interactions can be uniquely determined by requiring continuity of the coordinates and by imposing the global supersymmetry algebra. Specific local operators are identified for each of the two kinds of interactions. In type II theories, which have two ten-dimensional supersymmetries and contain closed strings only, the entire interaction hamiltonian consists of a single cubic vertex. The higher-order contact terms of the N = 8 supergravity theory that arises in the low-energy limit give an effective description of the exchange of massive string modes.

34138 **Infinity cancellations in SO(32) superstring theory.** Green, M.B.; Schwarz, J.H. (California Institute of Technology, Pasadena, CA 91125). pp 1013-1017 of Superstrings: The first 15 years of superstring theory. Schwarz, J.H. Philadelphia, PA; World Scientific Pub. Co. (1985).

Type I superstring theory was previously shown to be anomaly-free if the gauge group is SO(32). Here it is demonstrated that the same group is also singled out by the requirement that infinities can be canceled by combining diagrams.

34139 **The hexagon gauge anomaly in Type 1 superstring theory.** Green, M.B.; Schwarz, J.H. (California Institute of Technology, Pasadena, CA 91125). pp 1018-1039 of Superstrings: The first 15 years of superstring theory. Schwarz, J.H. Philadelphia, PA; World Scientific Pub. Co. (1985).

Hexagon diagrams with external on-mass-shell Yang-Mills gauge particles are investigated in Type I superstring theory. Both the annulus and the Mobius-strip diagrams are shown to give anomalies, implying that spurious longitudinal modes cannot be consistently decoupled. However, the anomalies cancel when the two diagrams are added together if the gauge group is chosen to be SO(32). In carrying out the analysis, two different regulators are considered, but the same conclusions emerge in both cases. The authors point out where various terms in the low-energy effective action originate in superstring diagrams.

34140 **Supersymmetric dual string theory.** Green, M.B.; Schwarz, J.H. (California Institute of Technology, Pasadena, CA 91125). pp 382-398 of Superstrings: The first 15 years of superstring theory. Schwarz, J.H. Philadelphia, PA; World Scientific Pub. Co. (1985).

Vertex operators for the emission of massless open-string states are constructed using the light-cone gauge formalism introduced in the first paper of this series. The vertices for vector and spinor emission transform into one another under supersymmetry in the same way as the states themselves. This enables one to construct amplitudes and deduce the relationships among them implied by supersymmetry. Various four-particle tree graphs are explicitly investigated and shown to satisfy the duality requirement.

34141 **Supersymmetric dual string theory.** Green, M.B.; Schwarz, J.H. (California Institute of Technology, Pasadena, CA 91125). pp 399-418 of Superstrings: The first 15 years of superstring theory. Schwarz, J.H. Philadelphia, PA; World Scientific Pub. Co. (1985).

Single-loop amplitudes with three or four external particles are constructed in the supersymmetric dual theory. The three-particle loops vanish, signifying the absence of coupling constant renormalization. The four-particle planar-loop amplitude has a divergence that can be absorbed into a renormalization of α', the Regge slope, since it is proportional to the derivative of the tree amplitude with respect to α'. Furthermore, the authors demonstrate that this divergence can be expressed as the emission from a tree of a zero-mass closed-string scalar state at zero momentum. There is also a divergence in the non-planar loop that couples one external SU(eta) singlet [the states of the model are SU(eta) singlet and adjoint representations] to three other particles. This divergence can be interpreted as a wave-function renormalization for external singlets. The non-planar loop with s-channel SU(eta) singlet quantum numbers is shown to contain poles corresponding to the states of the closed-string sector of the theory (which includes the massless states of simple d = 10 supergravity).

34142 **Supersymmetrical dual string theory.** Green, M.B.; Schwarz, J.H. (Queen Mary College, Univ. of London, London). pp 338-366 of Superstrings: The first 15 years of superstring theory. Schwarz, J.H. Philadelphia, PA; World Scientific Pub. Co. (1985).

It is proved that the physical states of the open-string sector of the ten-dimensional string theory form supersymmetry multiplets. The proof is achieved by first constructing a new formulation of the spectrum generating algebra, and then forming the supersymmetry operator (as well as associated operators) and demonstrating that it transforms as a spinor under Lorentz transformations and has the correct anticommutation relations. The results can be interpreted either in terms of a covariant formulation or in terms of a light-cone gauge formulation. In the former case certain formulas are not completely proved, although they are in the latter. When interpreted in four dimensions (by dimensional reduction) the string theory provides an interacting theory of an infinite number of massive representations of N=4 supersymmetry involving particles of arbitrarily high spin.

34143 **Supersymmetrical string theories.** Green, M.B.; Schwarz, J.H. (California Institute of Technology, Pasadena, CA 91125). pp 367-371 of Superstrings: The first 15 years of superstring theory. Schwarz, J.H. Philadelphia, PA; World Scientific Pub. Co. (1985).

A supersymmetrical light-cone-gauge string action is presented. It provides a basis for understanding the previously-studied supersymmetrical dual string theory as well as two new closed-string

theories that have extended supersymmetry in ten dimensions, corresponding to N=8 supersymmetry in four dimensions.

34144 **The pseudofermion method and its applications in lattice QCD.** Fucito, F.; Solomon, S. (California Institute of Technology, Pasadena, CA 91125). pp 64-75 of Advances in lattice gauge theory. Duke, D.W.; Owens, J.F. Philadelphia, PA; World Scientific Pub. Co. (1985). (CONF-8504167—).

From Conference on advances in lattice gauge theory; Coral Gables, FL, USA (10 Apr 1985).

The authors show how the pseudofermion method can be efficiently implemented on a parallel machine. Results obtained for finite temperature and zero temperature QCD are discussed.

34145 **Portrait of a proton.** Gottlieb, S. (Univ. of California, San Diego, La Jolla, CA 92093). pp 105-112 of Advances in lattice gauge theory. Duke, D.W.; Owens, J.F. Philadelphia, PA; World Scientific Pub. Co. (1985). (CONF-8504167—).

From Conference on advances in lattice gauge theory; Coral Gables, FL, USA (10 Apr 1985).

The author presents the results of a calculation of hadron wave functions in SU(3) lattice gauge theory. The proton, delta, pion and rho meson are all studied. The first three particles have wave functions which fall off more quickly than that for the rho. This suggests that the rho is much more subject to finite size effects, and may explain the difficulty so far in calculating the pi-rho mass splitting.

34146 **Lattice calculation of weak matrix elements: A progress report.** Bernard, C.; Hockney, G.; Soni, A.; Draper, T. (Univ. of California, Los Angeles, CA 90024). pp 113-135 of Advances in lattice gauge theory. Duke, D.W.; Owens, J.F. Philadelphia, PA; World Scientific Pub. Co. (1985). (CONF-8504167—).

From Conference on advances in lattice gauge theory; Coral Gables, FL, USA (10 Apr 1985).

This is a progress report of a project that is designated to calculate non-leptonic weak matrix elements on a space-time lattice. The emphasis here is on presentation of the preliminary results from a pilot Monte-Carlo done with a "small" (i.e., 6/sup 3/ x 17 fermion) lattice at $\beta = 5.7$ with 16 gauge configurations. Because of its large magnitude the origin of the $\Delta I = 1/2$ enhancement is investigated as a test case. For a lattice meson of mass $\simeq$ kaon mass the authors find the $\Delta I = 3/2$ amplitude compatible with zero within their statistics and a clear and significantly enhanced signal for the $\Delta I = 1/2$ amplitude. The dominance of the $\Delta I = 1/2$ amplitude appears to be a manifestation of the dominance of a class of graphs called the eye graphs. A preliminary measurement of the ($\Delta S = 2$) LL,LR operators is also discussed.

34147 **Pseudofermionic simulation of QCD thermodynamics.** Karsch, F.; Gavai, R.V. (Dept. of Physics, Univ. of Illinois at Urbana-Champaign, 1110 West Green Street, Urbana, IL 61801). pp 148-156 of Advances in lattice gauge theory. Duke, D.W.; Owens, J.F. Philadelphia, PA; World Scientific Pub. Co. (1985). (CONF-8504167—).

From Conference on advances in lattice gauge theory; Coral Gables, FL, USA (10 Apr 1985).

The authors discuss recent results obtained for the thermodynamics of QCD in the presence of three light quark flavors. The influence of dynamical fermions has been simulated utilizing the pseudofermion algorithm. Their MC results indicate a rapid crossover behavior of all thermodynamic observables in the presence of light fermions. In the zero mass limit the authors find evidence for a chiral phase transitions at T/sub C//Λ/sub L/ = 183 +- 10.

34148 **MCRG results for SU(2) and SU(3) lattice gauge theories.** Patel, A.; Gupta, R. (Physics Dept., Univ. of California, La Jolla, CA 92093). pp 206-217 of Advances in lattice gauge theory. Duke, D.W.; Owens, J.F. Philadelphia, PA; World Scientific Pub. Co. (1985). (CONF-8504167—).

From Conference on advances in lattice gauge theory; Coral Gables, FL, USA (10 Apr 1985).

The authors present detailed results for the non-perturbative β-function along the Wilson axis for the SU(2) and SU(3) pure gauge theories, using the Monte Carlo Renormalization Group (MCRG) method and the $\sqrt{3}$ block transformation. They compare these results with the "β-functions" extracted from physical observables like the string tension, the deconfinement transition temperature and the O/sup ++/ glueball mass. The analysis shows that there is no asymptotic scaling for the coupling K/sub F/ identical to 4g/sup -2/ $<$ 2.5 for SU(2) and K/sub F/ identical to 6/sub g// sup -2/ $<$ 6.1 for SU(3). They also give the results for the MCRG improved lattice action for both the theories.

34149 **Using MACSYMA to write long FORTRAN codes for simplicial-interpolative lattice gauge theory.** Cahill, K.; Reeder, R. (Dept. of Physics and Astronomy, Univ. of New Mexico, Albuquerque, NM 87131). pp 424-440 of Advances in lattice gauge theory. Duke, D.W.; Owens, J.F. Philadelphia, PA; World Scientific Pub. Co. (1985). (CONF-8504167—).

From Conference on advances in lattice gauge theory; Coral Gables, FL, USA (10 Apr 1985).

The authors describe a use of the symbol manipulator MACSYMA to write a long lattice-gauge-theory FORTRAN program. The authors use MACSYMA's Diff, Do, Ratcoef, Ratsimp, Subst, and Sum functions to calculate the principal formulas of the program. Then they use MACSYMA's FORTRAN, Part, Print, Save, and Writefile functions to express these formulas in compilable FORTRAN code. The resulting 1,600-line code simulates SU/sub 2/ gauge theory in three dimensions by the simplicial interpolative method.

34150 **The potential energy for quarks.** Heller, L. (Theoretical Div., Los Alamos National Lab., Los Alamos, NM 87545). pp 306-321 of Workshop on nuclear chromodynamics: Quarks and gluons in particles and nuclei. Brodsky, S.; Moniz, E. Philadelphia, PA; World Scientific Pub. Co. (1985). (CONF-8508127—).

From Nuclear chromodynamics: quarks and gluons in particles and nuclei; Santa Barbara, CA, USA (12 Aug 1985).

It is argued on theoretical and phenomenological grounds that confinement of quarks is intrinsically a many-body interaction. The Born-Oppenheimer approximation to the bag model is shown to give rise to a static potential energy that consists of a sum of two-body Coulomb terms and a many-body confining term. Following the success of this potential in heavy QQ-bar systems it is being applied to Q/sup 2/Q-bar/sup 2/. Preliminary calculations suggest that dimeson bound states with exotic flavor, such as bbsbars-bar, may exist.

34151 **Multiquark evolution in QCD.** Ji, C.R. (Stanford Linear Accelerator Center, Stanford Univ., Stanford, CA 94305). pp 60-78 of Workshop on nuclear chromodynamics: Quarks and gluons in particles and nuclei. Brodsky, S.; Moniz, E. Philadelphia, PA; World Scientific Pub. Co. (1985). (CONF-8508127—). Contract AC03-76SF00515.

From Nuclear chromodynamics: quarks and gluons in particles and nuclei; Santa Barbara, CA, USA (12 Aug 1985).

The authors present a formalism for the evolution in Q/sup 2/ of multiquark systems as an application of perturbative quantum chromodynamics (QCD) to asymptotic, exclusive nuclear amplitudes. To leading terms in log Q/sup 2/ the formalism is equivalent to solving the renormalization group equations for these amplitudes. Completely antisymmetric multiquark color-singlet representations are constructed and their evolution is investigated from the one-gluon exchange kernel. The authors argue that the evolution equation, together with a cluster decomposition, demonstrates a transition from the traditional meson and nucleon degrees of freedom of nuclear physics to quark and gluon degrees of freedom with increasing Q/sup 2/, or at small internucleon separations.

34152 **The t-expansion: A short review.** Karliner, M. (Stanford Linear Accelerator Center, Stanford Univ., Stanford, CA 94305). pp 134-148 of Workshop on nuclear chromodynamics: Quarks and gluons in particles and nuclei. Brodsky, S.; Moniz, E. Philadelphia, PA; World Scientific Pub. Co. (1985). (CONF-8508127—). Contract AC03-76SF00515.

From Nuclear chromodynamics: quarks and gluons in particles and nuclei; Santa Barbara, CA, USA (12 Aug 1985).

The t-expansion is a nonperturbative calculational tool recently developed for Hamiltonian systems. A short review of the method is given. It is followed by a summary of applications to two dimensional spin systems and to four dimensional non-abelian lattice gauge theories.

65 PHYSICS II

6510 Nuclear Physics

REFER ALSO TO CITATION(S) 34085, 34193, 34196, 34410

34153 (ANL-PHY—86-1) Proceedings of the symposium on the many facets of heavy ion fusion reactions. (Argonne National Lab., IL (USA)). 1986. Contract W-31109-ENG-38. 664p. (CONF-860396—). NTIS, PC A99/MF A01; 1; GPO Dep. File Number DE87010055.

From Symposium on the many facets of heavy ion fusion reactions; Argonne, IL, USA (24 Mar 1986).

The topics of the symposium are sub- and near-barrier fusion, limitations to fusion, compound nucleus decay and spectroscopy, incomplete fusion processes, and fragmentation and liquid-gas phase transition. Separate abstracts were prepared for 54 papers in these proceedings. (DWL)

34154 (DOE/ER/40020—T3) Assessment of the current status of basic nuclear data compilations. (National Research Council, Washington, DC (USA). Panel on Basic Nuclear Data Compilations). Mar 1987. Contract FG01-81ER40020. 28p. NTIS, PC A03/MF A01; GPO Dep. File Number DE87007403.

The Panel on Basic Nuclear Data Compilations believes that it is of paramount importance to achieve as short a cycle time as is reasonably possible in the evaluation and publication of the A-chains. The panel, therefore, has concentrated its efforts on identifying those factors that have tended to increase the cycle time and on finding ways to remove the obstacles. An important step was made during the past year to address reduction of the size of the published evaluations - another factor that can reduce cycle time. The Nuclear Structure and Decay Data (NSDD) network adopted new format guidelines, which generated a 30% reduction by eliminating redundancy and/or duplication. A current problem appears to be the rate at which the A-chains are being evaluated, which, on the average, is only about one-half of what it could be. It is hoped that the situation will improve with an increase in the number of foreign centers and an increase in efficiency as more A-chains are recycled by the same evaluator who did the previous evaluation. Progress has been made in the area of on-line access to the nuclear data files in that a subcommittee report describing the requirements of an on-line system has been produced. 2 tabs.

34155 (GSI—86-19) 10 years of uranium beam at the UNILAC. Proceedings. Angert, N.; Kienle, P. (eds.). (Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (Germany, F.R.)). Nov 1986. 572p. (CONF-8604184—). NTIS (US Sales Only), PC A24/MF A01. File Number DE87751897.

From Symposium on 10 years of uranium beam; Darmstadt, F.R. Germany (2 Apr 1986).

These proceedings contain the articles presented at the named symposium. They concern heavy ion accelerators, quasi-fission, deep inelastic heavy ion reactions, multi-nucleon transfer reactions of heavy ions, heavy ion fusion reactions with the study of high spin states and the production of superheavy and neutron-deficient nuclei, subthreshold pion production, positron production in heavy ion collisions, and the interaction of heavy ions with matter. (HSI).

34156 (JINR—D-13-85-793) 12. International symposium on nuclear electronics. (Joint Inst. for Nuclear Research, Dubna (USSR)). 1985. 473p. (CONF-8507152—). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145.

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

Individual papers have been cataloged separately.

34157 (LPCC—86-02) Heavy ion induced fission between 10 and 100 MeV/u. Steckmeyer, J.C.; Tamain, B. (Caen Univ., 14 (France). Lab. de Physique Corpusculaire). May 1986. 15p. (CONF-8605242—1). NTIS (US Sales Only), PC A02/MF A01. File Number DE87751802.

From Seminar on fission; Habay la Neuve, Belgium (22 May 1986).

Heavy ion induced fission between 10 and 100 MeV/u is discussed. It is shown that one can obtain information on fusion limits and on typical times characterizing nuclear matter. Intermediate energy heavy ions can be used to build very excited fusion nuclei. Section I shows that fission can then be used as a tool to test the fusion mechanism and to discover what are the extreme limits concerning fusion and hot nuclei formation. In section II, it is shown that when very hot nuclei are built, fission evaporation competition cannot any longer be fully described in the usual way by the statistical model. New features as dynamical aspects or cluster evaporation modify dramatically the landscape. Concerning the detailed fission properties of very hot nuclei (for instance fragments properties), no strong deviations from the already know systematics has been obtained. However, very few detailed studies are yet available and a clear experimental program has to be developed in order to progress. From a theoretical point of view, it is rather necessary to described fission and evaporation is an unified way.

6511 Experimental Techniques

REFER ALSO TO CITATION(S) 33415

34158 (FEI—1708) New method of the determination of the double beta decay probability. Bogatyrev, V.K.; Seregin, A.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.). 1985. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702261.

A new method of determination of the double beta decay probability is proposed. The method is based on present-day experimental achievements, in laser technology, mass-spectroscopy and it uses the developed method of separation and detection of ultrasmall quantities of inert gases that is already used in the Davis experiments on solar neutrino detection. The essence of the method is as follows: before the experiment the detector is cleaned of stable krypton and xenon isotopes by washing with ultra-pure hydrogen or helium. After holding the detector underground within a year krypton and xenon produced inside the detector after double beta decay are separated and their concentration and isotopic composition are measured. The analysis of different background factors shows the possibility of measuring the double beta decay probability up to 10^{-33} - 10^{-34} s^{-1} and less in case of need. 12 references.

6512 Nuclear Properties And Reactions, A=1-5, Experimental

34159 (DOE/ER/40036—6) Measurement of observables in the pion-nucleon system and investigation of charge symmetry in ^{3}H and ^{3}He: Progress report, March 1, 1986-February 28, 1987. Sadler, M.E. (Abilene Christian Univ., TX (USA)). Mar 1987. Contract AS05-81ER40036. 58p. NTIS MF A01; 2; GPO Dep. File Number DE87008091.

This report describes the progress made in the past year in the pion scattering programs in which Abilene Christian University is collaborating. The measurements include (1) a complete set of observables in the pion-nucleon system in the momentum interval 400 to 700 MeV/c, (2) differential cross sections at low energy for pion-nucleon charge exchange, and (3) elastic and inelastic scattering of π^{+-} on ^{3}H and ^{3}He. Highlights of the progress in 1986 to 87 include (1) first measurement of the spin rotation parameters A and R for $\pi^{+-}p \rightarrow \pi^{+-}p$ scattering at 427 to 657 MeV/c, for which the principal investigator received support from Associated Western Universities (AWU) and ACU for sabbatical leave in Los Alamos, (2) final publication of the data for the differential cross sections and analyzing powers for $\pi^{+-}p$ elastic scattering at 378 to 687

MeV/c, (3) final publication of forward-angle differential cross sections for $\pi^- p \rightarrow \pi^0 n$ at 101 to 147 MeV/c, and (4) continued development of analysis capabilities on the ACU VAX-11/785, including full implementation of the LAMPF Q system MAPPER and DISSPLA graphics software. TEDI and TEX word processing and the associated hardware to utilize the software. The experiments are conducted at the Clinton P. Anderson Meson Physics Facility at Los Alamos (LAMPF). The experiments are performed in collaboration with UCLA, George Washington University, LAMPF Groups MP-4, MP-10 and MP-13, and Catholic University. 37 refs., 13 figs., 1 tab.

34160 **(JINR-R—1-86-435) P(^{3}He,t) charge-exchange reaction at 4.4-18.3 GeV/c with Δ/isobar production.** Ableev, V.G.; Vorob'ev, G.G.; Dimitrov, Kh. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1986. 15p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702348.

Submitted to the journal Yad. Fiz.

The invariant differential cross sections of a helium-3 to triton charge-exchange reaction with Δ-isobar excitation on protons at 4.40, 6.81, 10.79 and 18.3 GeV/c are presented. The cross sections are measured at small triton emission angles, the absolute normalization uncertainty is no more than (8-13)%. The data are well reproduced by the calculation made within the framework of the Glauber-Sitenko model. They are also compared with the calculation based on the one-meson-exchange model. 16 references, 5 figures, 3 tables.

34161 **(JINR-R—15-86-454) D+D thermonuclear fusion reactions with polarized particles.** Kozma, P. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1986. 18p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702382.

Submitted to the journal Fiz. Ehlem. Chastits At. Yadra.

Polarization measurements from the ^{2}H(d, n)^{3}He and ^{2}H(d, p)^{3}H thermonuclear reactions at deuteron energies below 1 MeV are anayzed. Results of analysis enable to discuss the existence of ^{4}He excited states in the vicinity of d+d threshold energy as well as to extrapolate total cross-sections σ/sub tot/ (d+d) into the region of very low energies. 38 references, 10 figures, 1 table.

6513 Nuclear Properties And Reactions, A=6-19, Experimental

34162 **(CONF-8704112—5) Beryllium-10: Half-life and AMS-standards.** Hofmann, H.J.; Beer, J.; Bonani, G.; von Gunten, H.R.; Raman, S.; Suter, M.; Walker, R.L.;Woelfli, W.; Zimmermann, D. (Oak Ridge National Lab., TN (USA); Eidgenoessische Technische Hochschule, Zurich (Switzerland). Inst. fuer Mittelenergiephysik; Bern Univ. (Switzerland). Lab. fuer Radiochemie). 1987. Contract AC05-84OR21400. 15p. NTIS, PC A02/MF A01; GPO Dep. File Number DE87009829.

From 4. international symposium on accelerator mass spectrometry; Ontario, Canada (27 Apr 1987).

Absolute AMS measurements of ^{10}Be require reliable standards for calibration. Among the existing standards, rather large differences have been observed. These differences were found partially to be due to the different half-life values which were assumed. Also for comparison of AMS data with activity measurements, it is necessary to know the ^{10}Be half-life as precisely as possible. Starting with 5 ml of the standardized ORNL-MASTER solution, a working solution with a well-defined ^{10}Be content was prepared. Its specific activity was determined by liquid scintillation counting. This measurement yielded a new value of (1.52 +- 0.05) My for the ^{10}Be half-life, which is in agreement with the previously reported values but is about three times more accurate. Two independent dilution series produced new AMS standards with ^{10}Be/^{9}Be ratios of the order of 10^{-10} and 10^{-11}. These standards were measured at the ETH/SIN AMS facility with high accuracy and are compared with other available ^{10}Be standards. 15 refs, 2 figs., 3 tabs.

34163 **(ISN—86-59) Selectivity of the (/sup 13/C, /sup 13/N), /sup 13/C, /sup 13/B) and (/sup 12/C, /sup 12/N) reactions at 30 MeV/n.** Von Oertzen, W.; Adamides, E.; Bohlen, H.G. (Grenoble-1 Univ., 38 (France). Inst. des Sciences Nucleaires). May 1986. 3p. (CONF-860506—14). NTIS (US Sales Only), PC A02/MF A01. File Number DE87751840.

From International conference on heavy ion nuclear collisions in the Fermi energy domain; Caen, France (12 May 1986).

Charge exchange reactions induced by /sup 12/C and /sup 13/C are discussed on a /sup 12/C target nucleus. Comparison of cross sections for the population of discrete states and of the continuum gives information which determines the selectivity of these reactions with respect to various modes with and without spin-flip.

34164 **(JINR-R—1-86-300) Analysis of experimental data from th πi + ^{7}Li -> e$^+$ +e$^-$ + X reaction at 380 MeV pion kinetic energy.** Alekseev, G.D.; Alizade, V.V.; Baturin, V.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1986. 6p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702346.

The cross section of the $\pi^+ + {}^7$Li -> e$^+$ +e$^-$ +X reaction has been measured at 380 MeV kinetic energy. About 130 events have been registered. The cross section corresponding to registrating electrons and positrons with > 70 MeV energy in solid angle 0.2 sr^2 at 65 deg angle to the beam is Δσ/sub t/=(6.3+-0.9)x10^{-33} cm^2. The data on the $\pi^+ + {}^7$Li-> e$^+$ +e$^-$ +X and on the $\pi^+ + {}^7$Li -> e$^+$ +e$^-$ +p+ ^{6}Li reactions were used to determine the isovector nucleon form factor at K^2=0.13 (GeV/c)^2 transferred four momentum squared. The nuclear vertex was calculated in the model of nucleon association (MNA) and the shell model (SM). Two values of isovector form factor F$_1$/sup V/ have been obtained: F$_1$/sup V/ =1.63+-0.22 (MNA), F$_1$/sup V/=1.46+-0.22 (SM). 10 references, 5 figures.

34165 **(LA—11004-T) Pion nucleus single charge exchange reactions above the Δ(1232) resonance.** Rokni, S.H. (Los Alamos National Lab., NM (USA)). Jun 1987. Contract W-7405-ENG-36. 214p. NTIS, PC A10/MF A01; 1; GPO Dep. File Number DE87010839.

Forward-angle differential cross sections for the (π^+, π^0) reaction leading to the Isobaric Analog State in the residual nuclei at 300, 425, 500 and 550 MeV have been measured. Targets ranged in mass from ^{7}Li to ^{208}Pb. A description of the experimental setup and the analysis is presented. The 0^0 cross sections are found to rise markedly between 300 and 425 MeV, contrary to the extrapolation from the lower energy data and to the behavior of the free pion-nucleon single charge exchange process. The angular distributions are sharply forward peaked. Systematics of the data indicate increased volume penetration with increasing pion beam energy. The cross sections are compared with the results of Glauber model calculations indicating the significance of higher order processes even at these energies. 67 refs., 40 figs., 22 tabs.

6514 Nuclear Properties And Reactions, A=20-38, Experimental

34166 **Production and deexcitation of highly deformed / sup 67/Ga.** Majka, Z.; Brandan, M.E.; Fabris, D.; Hagel, K.; Menchaca-Rocha, A.; Natowitz, J.B.; Nebbia, G.; Prete, G.; Sterling, B.; Viesti, G. (Cyclotron Institute, Texas A & M University, College Station, Texas 77843). *Physical Review [Section] C: Nuclear Physics;* **35**: No. 6, 2125-2138(Jun 1987).

The energy spectra and angular distributions of alpha particles and protons emitted from /sup 67/Ga compound nuclei at excitation energies of 110 to 116 MeV formed in four different reactions have been measured. The populated angular momentum ranges deduced from fusion cross section information correspond to 0—24 h-dash-bar for ^{4}He+/sup 63/Cu, 0—38 h-dash-bar for /sup 12/C+/sup 55/Mn, 0—48 h-dash-bar for /sup 16/O+/sup 51/V, and 0—50 h-dash-bar for /sup 40/Ar+/sup 27/Al. The experimental data are analyzed using the angular-momentum-dependent statistical model and the rotating liquid drop model. Average multiplicities and barriers are extracted for different zones of angular mo-

mentum. Comparisons with the models indicate large deformations of the /sup 67/Ga nuclei at the higher angular momenta and suggest large deformation related increases in the nuclear level density and decreases of emission barriers. The p/α ratio decreases with increasing angular momentum less than expected for spherical emitters at the higher angular momenta. The average α emission barriers are found to be close to those which are calculated for emission from the tips of prolate deformed nuclei such as those predicted by the liquid drop model. The experimental proton barriers appear somewhat smaller than those calculated using the liquid drop model shapes.

6516 Nuclear Properties And Reactions, A=59-89, Experimental

34167 (CONF-870410—19) The angular momentum dependence of complex fragment emission. Sobtka, L.G.; Sarantites, D.G.; Li, Z.; Dines, E.L.; Halbert, M.L.; Hensley, D.C.; Schmitt, R.P.; Majka, Z.; Nebbia, G.; Griffin, H.C. (Washington Univ., St. Louis, MO (USA). Dept. of Chemistry; Oak Ridge National Lab., TN (USA); Texas A and M Univ., College Station (USA); Michigan Univ., Ann Arbor (USA); Los Alamos National Lab., NM (USA)). 1987. Contract AC05-84OR21400. 17p. NTIS, PC A02. File Number DE87009126.

From 193. national meeting of the American Chemical Society; Denver, CO, USA (5 Apr 1987).

Large fragment (A > 4) production at high angular momentum is studied via the reaction, 200 MeV ^{45}Sc + ^{65}Cu. Comparisons of the fragment yields from this reaction (high angular momentum) to those from ^{93}Nb + Be (low angular momentum) are used to verify the strong angular momentum dependence of large fragment production predicted by equilibrium models. Details of the coincident γ-ray distributions not only confirm a rigidly rotating intermediate but also indicate that the widths of the primary L-wave distributions decrease with increasing symmetry in the decay channel. These data are used to test the asymmetry and L-wave dependence of emission barriers calculated from a rotating, finite range corrected, liquid drop model. 21 refs., 10 figs.

34168 (DOE/ER/40210—2) Studies of complex fragment emission in heavy ion reactions: [Progress report for the period July 1, 1985 through December 31, 1986]. Sobotka, L.G. (Washington Univ., St. Louis, MO (USA). Dept. of Chemistry). Mar 1987. Contract AC02-85ER40210. 52p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87007750.

The production of large fragments, fragments with mass between light particles and fission fragments, in intermediate and high energy nuclear reactions has fostered the proposal of a number of novel reaction mechanisms. These include liquid-vapor equilibrium and nuclear shattering. Temporarily left in the wake of these exciting proposed mechanisms was the old standard, statistical decay of compound nuclei. To be sure, the standard treatment of compound nucleus decay did not deal with large fragment production. However, this omission was not due to any fundamental deficiency of statistical models, but rather an uncertainty concerning exactly how to splice large fragment emission into statistical models. A large portion of our program deals with this problem. Specifically, by studying the yields of large fragments produced in sufficiently low energy reactions we are attempting to deduce the asymmetry and l-wave dependence of large fragment emission from compound nuclear intermediates. This, however, is only half of the problem. Since the novel mechanisms proposed for large fragment emission were spawned by intermediate and high energy reaction data, we must also realize the relevance of the compound nucleus mechanisms at high energies. It is not unreasonable to suspect that compound nucleus-like objects are formed with less than complete momentum transfer and perhaps less than complete mass transfer. Therefore the study of large fragment production in low energy reactions should go hand in hand with the study of energy, mass, and angular momentum transfer in non-compound reactions. This thread joins the apparently divergent subjects covered in this report. 32 refs., 20 figs.

34169 (JINR-E—7-86-359) Feeding of yrast states in ^{89}Nb. Berinde, A.; David, I.; Trache, L. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions). 1986. 4p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702338.

The level structure of ^{89}Nb has been investigated using the (^{19}F, xnγ) reaction and gamma-ray spectrosocpy. The measurements were performed with the γ-γ coincidence technique using Ge(Li)-detectors. The direct feeding excitation functions of the quasirotational band levels and the angular distribution of gamma-rays have been measured in the ion energy range from 50 MeV to 70 MeV. New energy levels, their spins and parities are indicated. The data are explained on the basis of the shell model. 5 references, 3 figures.

34170 (KIYI—86-3) Cross sections of (γ,γ/sup '/) reactions on nuclei ^{77}Se, ^{79}Br at an energy 4-14 MeV. Bigan, Z.M.; Mazur, V.M.; Sokolyuk, I.V. (AN Ukrainskoj SSR, Kiev. Inst. Yadernykh Issledovanij). 1986. 15p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702385.

The cross sections for excitation of isomer states /sup 77m/Se, /sup 79m/Br in reaction (γ, γ') are determined. Measurements were carried out at an energy 4-14 MeV. Results of the experiment with theoretical calculations in the statistical fermi gas model are compared. 24 references, 2 figures, 2 tables.

34171 Nuclear Data Sheets for A = 70. Bhat, M.R. (National Nuclear Data Center, Brookhaven National Laboratory, Upton, New York 11973). *Nuclear Data Sheets;* **51**: No. 1, 95-160(May 1987). Contract AC02-76CH00016.

The 1978 evaluation of A = 70 (78KeO7) has been revised using experimental decay and reaction data received by the cutoff data noted below. Neutron reaction data: see the bibliography CINDA—A, CINDA—B, and supplements.

6517 Nuclear Properties And Reactions, A=90-149, Experimental

34172 (CONF-870410—17) Fragment emission in proton-xenon interactions in the near-threshold regime. Porile, N.T.; Bujak, A.T.; Carmony, D.D.; Chung, Y.H.; Gutay, L.J.; Hirsch, A.S.; Mahi, M.; Paderewski, G.L.; Sangster, T.C.; Scharenberg, R.P. (Purdue Univ., Lafayette, IN (USA)). 1987. Contract AC02-76ER01505. 13p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87007561.

From 193. national meeting of the American Chemical Society; Denver, CO, USA (5 Apr 1987).

Energy spectra of fragments, $3 \leqq 7 \leqq 14$, from the interaction of 1 to 20 GeV protons with xenon have been measured over a nearly continuous range of proton energies using an internal gas jet target in the AGS. Analysis of the fragment energy spectra shows the presence of two distinct fragment production mechanisms below 6 GeV, which we identify as binary and multi-fragment break up. The relative contribution of the binary process decreases with increasing proton energy and becomes negligible above 6 GeV. The data for the multi-fragment component above 4 GeV are consistent with the formation of fragments from a supersaturated gas of nucleons. The coexistence curve and the critical temperature are approached monotonically with increasing proton energy. 34 refs., 6 figs.

34173 (CRN-PN—86-18) Violent collisions between ions as heavy as krypton at Ganil and GSI. Rudolf, G. (Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires). May 1986. 11p. (CONF-860506—13). NTIS (US Sales Only), PC A02/MF A01. File Number DE87751835.

From International conference on heavy ion nuclear collisions in the Fermi energy domain; Caen, France (12 May 1986).

Data from violent collisions between heavy (A — > 100) beams and targets of comparable mass are reviewed. The deep-inelastic mechanism dominates up to 20 MeV/u, although some departures are already noticed. Above 20 MeV/u, some data have been interpreted in the frame of a participant-spectator model, but

taking in account mean field effects which are still important. At 35 and 44 MeV/u, such mechanisms allow to reach temperatures where the multifragmentation becomes possible.

34174 **(INIS-mf—10626) α and p emission before, during, and after fission of the fusion nucleus /sup 169/Ta: Nuclear deformation, field emission, and nuclear shadow.** Brucker, A. (Heidelberg Univ. (Germany, F.R.). Naturwissenschaftlich-Mathematische Gesamtfakultaet). 1986. 104p. (In German). NTIS (US Sales Only), PC A06/MF A01. File Number DE87751906.

In the asymmetric system 318 MeV /sup 28/Si + /sup 141/Pr the angular and energy distributions of α particles and protons were measured in coincidence with fission fragments. Identification and separation of the sources of sequential emission before (CN) and after (F) fission of the compound-nucleus /sup 169/Ta yields following multiplicities: M/sub CN//sup α/=0.38 +- 0.04, M/sub CN//sup p/=0.6 +- 0.15; M/sub F//sup α/=0.16 +- 0.03, M/sub F//sup p/=0.54 +- 0.15. Measurement of the cross sections δ/sub ER/=(608 +- 81) mb and δ/sub F/=(679 +- 159) mb for residual nucleus formation respectively fission fixes the mean angular momentum for fission l/sub F/=(94+-7)Planck constant and the maximal angular momentum l/sub F,max/=(110 +- 10)Planck constant (sharp cut-off model). From the angular correlation relative to the spin direction of the compound-nucleus an anisotropy parameter of A/sub α/=6.7 +- 0.8 and A/sub p/=1.3 +- 0.2 for α respectively proton emission from the compound-nucleus is measured, and by means of the semiclassical model of Dossing a quadrupole deformation parameter of the compound-nucleus of vertical strokeδvertical stroke=0.43 +- 0.05 consistent within the uncertainties of the analysis determined. Apart from pre-equilibrium emission under small angles to the beam significant deviations from sequential emission are observed only in the α emission and detailedly studied by means of angular correlation and energy spectra: (I) an strong nuclear shadowing of the fragment emission of 1/7 of its sequential value in a narrow angular range (≅40/sup 0/(FWHM)) in the direction of the detected fission fragment. From this a mean lifetime of the compound nucleus tau/sub CN/=(140-240).10/sup -22/s is obtained. (II) A perpendicularly to the scission axis strongly pronounced surplus M/sub SC//sup α/=(1.7 +- 0.4).10/sup -2/ and an observed deficit of equal magnitude in direction of the scission axis. (orig./HSI).

34175 **(LYCEN—8518) Decay study of the /sup 117/Cs and /sup 117/Xe nuclei.** Marguier, G.; Morgue, M.; Charvet, A.; Giroux, J.; Richard-Serre, C.; Genevey, J.; Huck, A.; Knipper, A.; Walter, G. (Lyon-1 Univ., 69 - Villeurbanne (France). Inst. de Physique Nucleaire). Apr 1985. 41p. NTIS (US Sales Only), PC A03/MF A01. File Number DE87751836.

Gamma-rays and conversion electrons emitted in the /sup 117/Cs and /sup 117/Xe decays have been studied from on-line mass-separated /sup 117/Cs sources at the ISOLDE facility. A new /sup 117/Xe decay scheme has been constructed and a level scheme has been established for the /sup 117/Cs decay. The results are discussed in the frame of our recent knowledge about odd-mass neutron-deficient I and Xe systematics.

34176 **Identification of /sup 182/Pb in /sup 40/Ca irradiations of /sup 147/Sm.** Toth, K.S.; Moltz, D.M.; Blonnigen, F.; Avignone F.T. III. (Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831). *Physical Review* [*Section*] *C: Nuclear Physics;* **35**: No. 6, 2330-2332(Jun 1987). Contract AC05-84OR21400.

The α decay of /sup 182/Pb was identified in bombardments of /sup 147/Sm with /sup 40/Ca ions. Its α-decay energy and half-life were determined to be 6.919 +- 0.015 MeV and 55/sub -35//sup +40/ ms, respectively. The nuclidic assignment was based on excitation-function and cross-bombardment (/sup 39/K+/sup 147/Sm) data and on decay-energy systematics. From the known mass of /sup 178/Hg and the 6.919-MeV α-decay energy we deduce the mass excess of /sup 182/Pb to be (-6823 +- 25) keV. Also, a half-life of 300 +- 80 ms was measured for /sup 183/Pb.

6518 Nuclear Properties And Reactions, A=150-189, Experimental

34177 **High-spin state spectroscopy in /sup 165,166/Yb.** Beck, E.M.; Bacelar, J.C.; Deleplanque, M.A.; Diamond, R.M.; Stephens, F.S.; Draper, J.E.; Herskind, B.; Holm, A.; Tjoem, P.O. (Lawrence Berkeley Lab., CA, USA. Nuclear Science Div.; California Univ., Davis, USA; Niels Bohr Inst., Copenhagen, Denmark; Oslo Univ., Norway. Fysisk Inst.). *Nuclear Physics* [*Section*] *A;* **464**: No. 3, 472-496(16 Mar 1987). Contract AC03-76SF00098.

Level schemes of /sup 165/Yb and /sup 166/Yb are studied up to high spins. Triple γ-ray coincidence spectra are analyzed for the first time. The observed bands in both nuclei are interpreted in terms of the cranked-shell model. In particular, the continuation of the lowest i/sub 13/2/ single quasineutron aligned band beyond the first observed backbend is seen in an odd-N nucleus and the interaction strength between this band and the three-quasiparticle band is evaluated. Constancy of the moment of inertia in /sup 166/Yb is observed at high spins and interpreted.

6519 Nuclear Properties And Reactions, A=190-219, Experimental

34178 **(LYCEN—8576) Quadrupole moments measured by nuclear orientation.** Bouchta, H. (Lyon-1 Univ., 69 - Villeurbanne (France). Inst. de Physique Nucleaire). 1985. 106p. (In French). NTIS (US Sales Only), PC A06/MF A01. File Number DE87751822.

Quadrupole interactions between the nuclei and solids have been studied with the low temperature nuclear orientation technique. The first series of measurements have been effected on the orientation of /sup 195H/g/sup m/ and /sup 197/Hg/sup m/, long lived daughter states in the /sup 195/Au and /sup 197/ Au decay. The lifetimes of these states are of the same order as the spin-lattice relaxation time. The reorientation of the intermediate states has been taken into account extending the dipole relaxation mechanism to non-equidistant relaxing substates. The experimental nuclear quadrupole moments, thus deduced are slightly different from theoretical estimations. A new high precision method accessible to levels with 100 ns to 1 m lifetimes, the level mixing resonance on oriented nuclei (LMR/ON) has been elaborated in collaboration with LEUVEN university (Belgium). In this technique the nucleus is subject to a non colinear electric plus magnetic combined interaction. The quadrupole interaction of Ag[7/2, = 40 s] isomer with the electric field gradient in zinc has been established to better than 1% observing its level mixing resonances; and also the ratio of electric field gradients of silver in zinc to cadmium. The electric quadrupole moments of /sup 106/Ag/sup m/, /sup 107/Ag/sup m/ and /sup 109/Ag/sup m/ have been established combining the level mixing resonances with classical low temperature quadrupole alignment measurements. The experimental values are in good agreement with theoretical calculations based on a semi-microscopical model using Yukawa potential.

34179 **Magnetic form factors of /sup 205/Tl and /sup 207/Pb: Establishing the limits of mean-field theory.** Papanicolas, C.N.; Cardman, L.S.; Heisenberg, J.H.; Schwentker, O.; Milliman, T.E.; Hersman, F.W.; Hicks, R.S.; Peterson, G.A.; McCarthy, J.S.; Wise, J. (University of Illinois at Urbana-Champaign, Nuclear Physics Laboratory and Department of Physics, Champaign, Illinois 61820). *Physical Review Letters;* **58**: No. 22, 2296-2299(1 Jun 1987). Contract AC02-79ER10338.

The ground-state magnetization densities of /sup 207/Pb and /sup 205/Tl have been studied by 180° elastic electron scattering. The magnetic form factors were found to be quenched substantially relative to the predictions of the independent-particle model. Microscopic calculations indicate that core polarization can account for part of the observed suppression but it is not sufficient to reproduce the data. The quenching observed at high momentum transfers is comparable to that observed in related electron-scattering studies in the lead region, and can be explained in terms of partial occupancy of shell orbits in /sup 208/Pb.

6520 Nuclear Properties And Reactions, A=220 And Above, Experimental

34180 (ANL/NDM—98) The fission cross section ratios and error analysis for ten thorium, uranium, neptunium and plutonium isotopes at 14.74 MeV neutron energy. Meadows, J.W. (Argonne National Lab., IL (USA). Applied Physics Div.). Mar 1987. Contract W-31109-ENG-38. 32p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87008180.

The error information from the recent measurements of the fission cross section ratios of nine isotopes, ^{230}Th, ^{232}Th, ^{233}U, ^{234}U, ^{236}U, ^{238}U, ^{237}Np, ^{239}Pu, and ^{242}Pu, relative to ^{235}U at 14.74 MeV neutron energy was used to calculate their correlations. The remaining 36 non-trivial and non-reciprocal cross section ratios and their errors were determined and compared to evaluated (ENDF/B-V) values. There are serious differences but it was concluded that the reduction of three of the evaluated cross sections would remove most of them. The cross sections to be reduced are ^{230}Th - 13%, ^{237}Np - 9.6% and ^{239}Pu - 7.6%. 5 refs., 6 tabs.

34181 (CONF-870601—3) High resolution measurement of the ^{238}U neutron capture yield for incident neutron energies between 1 and 100 keV. Macklin, R.L.; Perez, R.B.; de Saussure, G.; Ingle, R.W. (Oak Ridge National Lab., TN (USA); Tennessee Univ., Knoxville (USA). Dept. of Nuclear Engineering). 1987. Contract AC05-84OR21400. 8p. NTIS, PC A02/MF A01; GPO Dep. File Number DE87004268.

From Annual meeting of the American Nuclear Society; Dallas, TX, USA (7 Jun 1987).

Measurements of the capture gamma-ray spectrum of three U-238 metallic samples of areal densities, N = 0.0124, 0.0031, and 0.00057 at/b, were performed by placing a sample at the center of the Oak Ridge Electron Linear Accelerator liquid scintillator tank. Five measurements of the time of flight spectrum were performed for each sample thickness. Measurements were done with and without aluminum filters in the beam, at both 800 and 400 pulses per second to determine the energy-dependent background which arises from pulse overlap and room return. The fifth measurement had a polyethylene plug in the beam to determine the constant background due to cosmic rays and long-lived radioactivities in the sample and surrounding materials. The shape of the incident neutron spectrum was determined by the count rate of a 1-mm-thick Li-6 glass scintillation monitor placed upstream of the liquid scintillator. (DWL)

34182 (LA-UR—87-49) Evaluated delayed neutron precursor data. England, T.R.; Brady, M.C.; Arthur, E.D.; LaBauve, R.J.; Mann, F.M. (Los Alamos National Lab., NM (USA)). 1987. Contract W-7405-ENG-36. 6p. (CONF-870601—7). NTIS, PC A02/MF A01; GPO Dep. File Number DE87005118.

From Annual meeting of the American Nuclear Society; Dallas, TX, USA (7 Jun 1987).

Based on energetics, ~270 fission products should be delayed neutron precursors. Of these, ~85 have measured and evaluated emission probabilities (Pn's) and ~34 have measured spectra data; the latter account for 80% or more of the total anti ν/sub d/. Although the measurements are probably adequate for most reactor applications, complete data sets are needed for ENDF/B and for fission product yield evaluations. This paper briefly describes the use of systematics and nuclear models used to produce a complete set of data for 272 precursors and presents aggregate summation calculations needed to produce the conventional six time-group approximations. 10 refs., 2 figs.

34183 Actinide production in /sup 136/Xe bombardments of /sup 249/Cf. Gregorich, K.E.; Moody, K.J.; Lee, D.; Kot, W.K.; Welch, R.B.; Wilmarth, P.A.; Seaborg, G.T. (Nuclear Science Division, Lawrence Berkeley Laboratory, University of California, Berkeley, California 94720). *Physical Review [Section] C: Nuclear Physics;* **35**: No. 6, 2117-2124(Jun 1987). Contract AC03-76SF00098.

The production cross sections for the actinides from /sup 136/Xe bombardments of /sup 249/Cf at energies 1.02, 1.09, and 1.16 times the Coulomb barrier were determined. Chemical fractions of the individual actinide elements were prepared and the gamma, alpha, and spontaneous fission activities of the actinide isotopes were measured. The cross section distributions are presented and compared with those from other heavy ion bombardments of actinide targets. Conclusions are drawn as to the utility of these heavy ion bombardments for producing unknown isotopes in the actinide region. It is shown that for new neutron-rich actinide isotopes with atomic numbers smaller than that of the target these very heavy ion bombardments are perhaps the best method of production, and when using the most neutron-rich targets available new neutron-rich isotopes should be produced in quantities sufficient for their identification and study.

34184 Anisotropies in transfer-induced fission of /sup 16/O+/sup 232/Th. Videbaek, F.; Steadman, S.G.; Batrouni, G.G.; Karp, J. (Physics Division, Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review [Section] C: Nuclear Physics;* **35**: No. 6, 2333-2335(Jun 1987). Contract W-31-109-ENG-38.

Transfer-induced fission has been measured for /sup 16/O+/sup 232/Th at 105 MeV. The angular distributions have a small in-plane anisotropy, but a substantial out-of-plane anisotropy, increasing with the mass transfer. The transferred angular momentum needed to describe the distribution is in agreement with the semiclassical predictions.

6530 Nuclear Theory

REFER ALSO TO CITATION(S) 34116, 34151, 34152, 34153, 34166, 34179

34185 (CONF-870601—6) Interpretation of subcriticality measurements with strong spatial effects. March-Leuba, C.; March-Leuba, J.; Difilippo, F.C. (Tennessee Univ., Knoxville (USA); Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 7p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87004619.

From Annual meeting of the American Nuclear Society; Dallas, TX, USA (7 Jun 1987).

A methodology has been developed to account for spatial effects in subcriticality measurements. Using experimental data, this new analysis methodology allows estimation of model contamination without previous knowledge about the system, neither in the form of neutronic or geometric factor calculations. 5 refs., 1 fig.

34186 (GSI—86-21) Field-theoretical model for the description of nuclear matter in and beyond the thermal equilibrium. Relativistic mean-field theory for nuclear matter with two countercurrent nucleon currents. Cubero del Castillo-Olivares, M.; Schoenhofen, M. (Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (Germany, F.R.); Technische Hochschule Darmstadt (Germany, F.R.). Inst. fuer Kernphysik). Dec 1986. 90p. (In German). NTIS (US Sales Only), PC A05/MF A01. File Number DE87751898.

The present theses present for the case of the Walecka model a first attempt to describe nuclear and neutron matter beyond the thermal equilibrium in the framework of a relativistic quantum field theory. Nuclear matter with two oppositely directed nucleon currents interacting via classical bosonic fields is described by means of an anisotropic momentum distribution which imposes to the whole system two Fermi distributions with different mean velocities. Vacuum effects and antiparticles are thereby not regarded. The difference of characteristic quantities like effective mass or interaction energy on parameters of the momentum distribution is studied. (orig./HSI).

34187 (IPNO-DRE—86-08) Review of Bose-Fermi and "Supersymmetry" models; problems in particle transfer tests. Vergnes, M. (Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire). 1986. 36p. NTIS (US Sales Only), PC A03/MF A01. File Number DE87751801.

The first case suggested for a supersymmetry in nuclei was that of a j = 3/2 particle coupled to an 0(6) core. A more recent and elaborate scheme is the "multi-j" supersymmetry, describing the coupling of a particle in more than just one orbital, with the

three possible cores of the interacting boson model. A general survey of the particle transfer tests of these different models is presented and the results summarized. A comparison of IBFM-2 calculations with experimental data is discussed, as well as results of sum rules analysis. Present and future tests concerning extensions of the above mentioned models, particularly to odd-odd nuclei, are briefly indicated. It appears necessary to clearly determine if the origin of the difficulties outlined for transfer reactions indeed lies -as often suggested- in the simplified form of the transfer operator used in deriving the selection rules, and not in the models themselves.

34188 **(IPNO-TH—86-22) Percolation approach to nucleus break up.** Campi, X. (Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire). 1986. 1p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87751827.

Published in summary form only.

34189 **(IPNO-TH—86-27) Relativistic description of nuclear systems in the Hartree-Fock approximation.** Bouyssy, A.; Mathiot, J.F.; Nguyen Van Giai; Marcos, S. (Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire). Mar 1986. 41p. NTIS (US Sales Only), PC A03/MF A01. File Number DE87751818.

The structure of infinite nuclear matter and finite nuclei is studied in the framework of the relativistic Hartree-Fock approximation. A particular attention is paid to the contribution of isovector mesons. (π,p). A satisfactory description of binding energies and densities can be obtained for light as well as heavy nuclei. The spin-orbit splittings are well reproduced. Connections with non-relativistic formulations are also discussed.

34190 **(ISN—85-81) Pairing effects in rotating nuclei: a semi-classical approach.** Durand, M. (Grenoble-1 Univ., 38 (France). Inst. des Sciences Nucleaires). Oct 1985. 15p. (CONF-8509227—10). NTIS (US Sales Only), PC A02/MF A01. File Number DE87751830.

From IAEA topical meeting on phase space approach to nuclear dynamics; Trieste, Italy (30 Sep 1985).

The semi-classical phase-space distribution rho(r,p) is calculated for rotating superfluid nuclei, taking into account the reaction of the pairing field to the rotational motion. Moments of inertia and current distributions calculated by means of this distribution pass continuously from a rigid to an irrotational behaviour.

34191 **(ISN—85-101) Friedel oscillations from the Wigner-Kirkwood distribution in half infinite matter.** Durand, M.; Schuck, P.; Vinas, X. (Grenoble-1 Univ., 38 (France). Inst. des Sciences Nucleaires). 1985. 6p. (CONF-8509227—9). NTIS (US Sales Only), PC A02/MF A01. File Number DE87751826.

From IAEA topical meeting on phase space approach to nuclear dynamics; Trieste, Italy (30 Sep 1985).

The Wigner-Kirkwood expansion is derived in complete analogy to the low temperature expansion of the Fermi function showing that the Planck's constant and T play analogous roles in both cases. In detail however the Wigner distribution close to a surface is quite different from a Fermi function and we showed for instance that the Planck's constant expansion can account for the surface oscillations of the distribution.

34192 **(ISN—86-58) On the role of quantum and statistical effects in the liquid gas phase transition of hot nuclei.** Blin, A.H.; Hiller, B.; Reinhardt, H.; Schuck, P. (Grenoble-1 Univ., 38 (France). Inst. des Sciences Nucleaires). 1986. 45p. NTIS (US Sales Only), PC A03/MF A01. File Number DE87751817.

The triggering of the liquid-gas phase transition in hot nuclear matter by quantum and statistical fluctuations is studied in a microscopic approach to nucleation, which is a fluid-dynamical version of the imaginary-time dependent mean-field theory at finite temperatures.

34193 **(ISN—86-61) Direct measurements of total reaction cross sections between heavy ions from 10 to 100 MeV/amu: preliminary conclusions.** Bruandet, J.F. (Grenoble-1 Univ., 38 (France). Inst. des Sciences Nucleaires). May 1986. 17p. (CONF-860506—12). NTIS (US Sales Only), PC A02/MF A01. File Number DE87751800.

From International conference on heavy ion nuclear collisions in the Fermi energy domain; Caen, France (12 May 1986).

After a review of some theoretical formulations of the concept of total reaction cross σR, involving low energy (— < 10 MeV/amu) and high energy (> GeV/amu) models, two experimental methods used for direct measurements of σR, are presented, namely the beam attenuation and the associated γ-rays 4π detection methods. Then a number of experimental results of σR in the Fermi energy range is given and the data are compared on the one hand with the predictions of the low energy BASS model (assuming a classical one-dimensional nucleus-nucleus potential interaction), and on the other hand with the predictions of a "high-energy" microscopic calculation performed using the formalism of KAROL (assuming that nuclear reactions are produced by individual nucleon-nucleon interactions). Finally, some experimental and theoretical problems are discussed and general conclusions are tentatively proposed. 43 refs.

34194 **(ISN—86-62) Single and multiparticle Wigner distributions in inhomogeneous Fermi systems.** Durand, M.; Schuck, P.; Suraud, E. (Grenoble-1 Univ., 38 (France). Inst. des Sciences Nucleaires). May 1986. 3p. (CONF-8605145—6). NTIS (US Sales Only), PC A02/MF A01. File Number DE87751831.

From International conference on the physics of phase space; College Park, MD, USA (20 May 1986).

Published in summary form only.

34195 **(ISN—86-65) Phase space description of collective nuclear vibrations with the Vlasov equation plus quantum corrections.** Kohl, H.; Stringari, S.; Schuck, P. (Grenoble-1 Univ., 38 (France). Inst. des Sciences Nucleaires). Jun 1986. 24p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87751832.

We use the Vlasov equation plus the Planck's constant - corrections to describe collective nuclear vibrations in the small amplitude limit. Separable forces of the multipole - multipole type are employed to study the quadrupole and octupole resonances. Whereas the giant states exhibit the well known distortions of the Fermi sphere already at the classical level we find that the low lying 3/ sup -/ state has an isotropic pressure tensor in the Planck's constant -> 0 limit. Quantum corrections reestablish a small distortion and thus a finite restoring force.

34196 **(ISN-RA—1984-85) 1984-1985 ISN progress report.** (Grenoble-1 Univ., 38 (France). Inst. des Sciences Nucleaires). 1985. 202p. (In French). NTIS (US Sales Only), PC A10/MF A01. File Number DE87751829.

This progress report ISN 1984-1985 deals with the following subjects: nuclear physics theory, peripheral and intermediate energy physics, characteristics of reaction mechanisms in heavy ion collisions, nuclear structure, fundamental interactions, experimental methods and new instrumentation, some interdisciplinary research activities and technical activities, the SARA cyclotron and finally, technology transfer and valorisation.

34197 **(JINR-R—2-86-408) Investigation of the electronic charge distribution of the nucleon.** Bunatyan, G.G. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics). 1986. 10p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702358.

In the chiral bag model (CBM) the distribution of the electric charge density in the nucleon is investigated. The r.m.s. charge radii are calculated for the neutron and proton. The results of the calculation are compared with the experimental data. 22 references, 1 figure, 1 table.

34198 (JINR-R—4-86-453) Probability of two-phonon state excitation and their contribution into formation of giant multipole resonances. Velchev, Ch.; Ponomarev, V.Yu. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 6p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702368.

The reduced excitation probabilities of two-phonon states with different multipolarity in a wide range of excitation energy are calculated in the framework of the quasiparticle-phonon model taking ^{90}Zr as an example. The shape of resonance and their integral excitation probabilities are not very sensitive neither the account of the excitation of two-phonon configuration is made or not. 11 references, 1 figure, 1 table.

34199 (JINR-R—6-86-404) Relation between quadrupole and dipole nuclear moments. Avotina, M.P.; Kratsikova, T.I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1986. 4p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702373.

A formula for calculation of the electric quadrupole moments of nuclei is discussed. The quadrupole moment is described by magnetic dipole moments of free and bounded nucleons. A comparison of the calculated values of quadrupole moments with experimental ones shows that the moments of strongly deformed and heavy nuclei agree within 15% and for the others within 50%. 7 references, 1 table.

34200 (LBL—23228) Particle evaporation spectra with inclusion of thermal shape fluctuations. Moretto, L.G.; Bowman, D.R. (Lawrence Berkeley Lab., CA (USA)). Apr 1987. Contract AC03-76SF00098. 16p. (CONF-870153—2). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009553.

From 25. international winter meeting on nuclear physics; Bormio, Italy (19 Jan 1987).

The origin of the substantial sub-Coulomb component observed in proton and ^{4}He evaporation spectra at high excitation energy is attributed to the thermal excitation of shape degrees of freedom. A critique of the Hauser-Feshbach theory as used in evaporation codes is presented. A new formalism including the thermal excitation of collective modes as well as quantal penetration in the framework of a transition state approach is derived. 5 figs.

34201 (UCRL—92469) Shell model calculations of /sup 90,88/Zr and /sup 90,88/Y. Becker, J.A.; Bloom, S.D. (Lawrence Livermore National Lab., CA (USA); Brookhaven National Lab., Upton, NY (USA)). 3 Sep 1985. Contract AC02-76CH00016;W-7405-ENG-48. 8p. (CONF-850942—60). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87008211.

From 190. American Chemical Society national meeting; Chicago, IL, USA (8 Sep 1985).

Conventional spherical shell model calculations have been undertaken to describe /sup 90,88/Zr and /sup 90,88/Y. In these large scale calculations valence orbitals included 1f/sub 5/2/,2p/sub 3/2/,2p/sub 1/2/, and 1g/sub 9/2/. The d/sub 5/2/ orbital was included for ^{90}Y and for high-spin calculations in ^{90}Zr. Restrictions were placed on orbital occupancy so that the basis set amounted to less than 25,000 Slater determinants. Calculations were done with a local, state independent, two-body interaction with single Yukawa form factor. Predicted excitation energies and electromagnetic transition rates are compared with recent experimental results. 6 refs., 2 figs.

34202 Nucleon transport induced by two-body collisions. Ayik, S. (Tennessee Technological University, Cookeville, Tennessee 38505; Joint Institute for Heavy-Ion Research, Oak Ridge, Tennessee 37831; Oak Ridge National Laboratory, Physics Division, Oak Ridge, Tennessee 37831). *Physical Review [Section] C: Nuclear Physics;* **35**: No. 6, 2086-2089(Jun 1987). Contract AS05-76ER04936.

Transport coeffic,ents for nucleon and momentum transport induced by the direct two-body collisions are calculated using a Fermi gas model for the colliding nuclei. It is found that at temperatures around T = 5—6 MeV, the two-body transport coefficients are larger than the one-body transport coefficients by a factor of 2—3, resulting in much broader fragment distributions in nuclear collisions.

34203 Three-body calculations at Los Alamos. Friar, J.L. (Los Alamos National Lab., NM). *Few-Body Systems, Supplementa;* 94-103(1986). (CONF-8610272—).

From BVS/NVS joint study-day; Mol, Belgium (10 Oct 1986).

The author reviews the Los Alamos-Iowa collaboration's program of investigating the trinucleon systems by solving the Faddeev equations in configuration space. This work was motivated by four goals: (1) By working in configuration space, where intuition is greatest, investigate graphically those trinucleon properties which are determined by specific features of wave functions; (2) Produce benchmark calculations against which new techniques and numerical methods can be measured; (3) Investigate the effect of the Coulomb interaction between the two protons in ^{3}He and in the p-d system; (4) Systematically investigate the various trinucleon observables. (Auth.).

34204 Variational Monte Carlo calculations of few-body nuclei. Wiringa, R.B. (Argonne National Lab., IL). *Few-Body Systems, Supplementa;* 130-139(1986). (CONF-8610196—).

From European workshop on few body physics; Rome, Italy (7 Oct 1986).

The variational Monte Carlo method is described. Results for the binding energies, density distributions, momentum distributions, and static longitudinal structure functions of the ^{3}H, ^{3}He, and ^{4}He ground states, and for the energies of the low-lying scattering states in ^{4}He are presented. (Auth.).

34205 Do nucleons dissolve. Goldman, T. (Theoretical Div., Los Alamos National Lab., Los Alamos, NM 87545). pp 363-378 of Workshop on nuclear chromodynamics: Quarks and gluons in particles and nuclei. Brodsky, S.; Moniz, E. Philadelphia, PA; World Scientific Pub. Co. (1985). (CONF-8508127—).

From Nuclear chromodynamics: quarks and gluons in particles and nuclei; Santa Barbara, CA, USA (12 Aug 1985).

A model is presented which describes multiquark, nuclear-like systems in a manner consistent with QCD, and with nuclear properties. Within the model, it is found that quasi-nucleon structures describe the minimum energy state of the system. This result is due to a balance between quarks lowering their kinetic energy by spreading out through the system, and lowering their color-magnetic spin-spin interaction energy by forming nucleon-like clusters. A strong core repulsion is evident, as is a realistic dip in the central matter density of the /sup 4/He-like, 12-quark system.

34206 Structure functions of nuclei in the pion exchange model. Berger, E.L.; Coester, F. (High Energy Physics Div., Argonne National Lab., Argonne, IL 60439). pp 255-271 of Workshop on nuclear chromodynamics: Quarks and gluons in particles and nuclei. Brodsky, S.; Moniz, E. Philadelphia, PA; World Scientific Pub. Co. (1985). (CONF-8508127—). Contract W-31-109-ENG-38.

From Nuclear chromodynamics: quarks and gluons in particles and nuclei; Santa Barbara, CA, USA (12 Aug 1985).

A detailed derivation is presented of the fact that the deep inelastic structure function of a nucleus may be expressed directly in terms of the empirical structure functions of the constituent nucleons and mesons and the wave function of the nuclear bound state. The assumptions made are specified. The pion exchange model provides a unified quantitative description for all x of nuclear effects observed in deep inelastic scattering of charged and neutral leptons from nuclei.

34207 Open problems in multiquark spectroscopy. Lipkin, H.J. (Argonne National Lab., Argonne, IL 60439). pp 328-342 of Workshop on nuclear chromodynamics: Quarks and gluons in particles and nuclei. Brodsky, S.; Moniz, E. Philadelphia, PA; World Scientific Pub. Co. (1985). (CONF-8508127—).

From Nuclear chromodynamics: quarks and gluons in particles and nuclei; Santa Barbara, CA, USA (12 Aug 1985).

The success of simple constituent quark models in single-hadron physics and their failure in multiquark physics is discussed, emphasizing the relation between meson and baryon spectra, hidden color and the color matrix, breakup decay modes, coupled channels, and hadron-hadron interactions via flipping and tunneling of flux tubes. Model-independent predictions for possible multiquark bound states are considered, with new evidence for stability of bound states containing two heavy quarks.

34208 **Quark-gluon plasma.** Kapusta, J.; Mekjian, A. (School of Physics and Astronomy, Univ. of Minnesota, Minneapolis, MN 55455). pp 149-167 of Workshop on nuclear chromodynamics: Quarks and gluons in particles and nuclei. Brodsky, S.; Moniz, E. Philadelphia, PA; World Scientific Pub. Co. (1985). (CONF-8508127—).

From Nuclear chromodynamics: quarks and gluons in particles and nuclei; Santa Barbara, CA, USA (12 Aug 1985).

Strangeness production has been proposed as a signal for the formation of quark-gluon plasma in ultrarelativistic nucleus-nucleus collisions. The authors address this problem in the framework of Bjorken's model for the longitudinal hydro-dynamic expansion of baryon-free matter. Different scenarios are considered for the assumed first order phase transition from QCD plasma into hadrons, including a slow transition via the Maxwell construction of co-existing phases, and a rapid transition from supercooling followed by reheating. The rate equations for strange quark and kaon abundances are solved numerically. With the most likely set of parameters the K/sup -//π/sup -/ ratio is about three times larger than in p-barp collisions at the same energy. This results primarily from the large rate constant in the hadron phase and from the long time spent in this phase.

34209 **Electromagnetic probes of nucleons and nuclei.** Arnold, R.G. (The American Univ., Washington, DC 20016). pp 238-254 of Workshop on nuclear chromodynamics: Quarks and gluons in particles and nuclei. Brodsky, S.; Moniz, E. Philadelphia, PA; World Scientific Pub. Co. (1985). (CONF-8508127—).

From Nuclear chromodynamics: quarks and gluons in particles and nuclei; Santa Barbara, CA, USA (12 Aug 1985).

A brief review is given of recent experimental results from high energy electron and muon scattering on nuclear targets. Electron-proton elastic scattering at SLAC, the A dependence of deep inelastic scattering at SLAC and CERN, and recent electron scattering experiments in the new program Nuclear Physics at SLAC are described. Some planned future experiments using high energy electrons and muons to probe nuclear targets are outlined.

34210 **Measurement techniques for radiative neutron capture.** Poenitz, W.P. (Argonne National Lab., Argonne, IL). pp 119-153 of Neutron radiative capture. Allen, B.J.; Bergovist, I.; Chrien, R.E.; Gardner, D.G.; Poenitz, W.P. Elmsford, NY; Pergamon Books Inc. (1984).

The neutron capture process results in a variety of effects and related quantities which are of interest in understanding its physical nature and relevant for practical applications. It is the intent of this introduction to review briefly the measurable effects of the capture process and to survey neutron sources commonly used in capture studies. Neutron flux measurements required in such experiments will also be considered. More detailed information on the latter two subjects will be available elsewhere.

34211 **Methods for calculating neutron capture cross sections and gamma-ray energy spectra.** Gardner, D.G. (Lawrence Livermore Lab., Livermore, CA). pp 62-118 of Neutron radiative capture. Allen, B.J.; Bergovist, I.; Chrien, R.E.; Gardner, D.G.; Poenitz, W.P. Elmsford, NY; Pergamon Books Inc. (1984).

The ultimate fate of neutrons produced in nuclear reactions is their absorption by atomic nuclei surrounding the source. Thus whether it be in fission or fusion reactors, in nuclear weapons, in accelerator shielding, or the more exotic realm of stellar nucleosynthesis, the capture cross sections and the gamma-ray spectra following capture are of great importance in understanding these processes and their applications. There is a well documented need for cross section and spectral information. Detailed statistical model calculations are becoming increasingly more common, and are used not only to interpolate between experimental measurements, but also as a basis to choose between discrepant data sets and to generate information in cases where experimental data are lacking. In this chapter we discuss various aspects of such calculations. A number of review or survey-type articles are mentioned, as a general introduction to either the techniques for calculating capture cross sections and gamma-ray spectra, or methods for obtaining quantities, such as radiation widths and nuclear level densities, that are required as input for the calculations.

34212 **Double beta decay: Recent developments and projections.** Avignone, F.T. III; Brodzinski, R.L.; Brown, D.P.; Evans, J.C.; Hensley, W.K.; Reeves, J.H.; Wogman, N.A. (Univ. of South Carolina, Columbia, SC 29208). pp 174-195 of Proceedings of the fourth workshop on grand unification. Weldon, H.A.; Langacker, P.; Steinhardt, P.J. Cambridge, MA; Birkhauser Boston Inc. (1983). (CONF-8304112—).

From 4. workshop on grand unification; Philadelphia, PA, USA (21 Apr 1983).

A report of recent events in both theoretical and experimental aspects of double beta decay is given. General theoretical considerations, recent developments in nuclear structure theory, geochronological determinations of half lives and ratios as well as laboratory experiments are discussed with emphasis on the past three years. Some projections are given.

6540 Radiation And Shielding Physics

REFER ALSO TO CITATION(S) 34433

34213 **(CONF-870601—2) A nodal integral method for the neutron diffusion equation in cylindrical geometry.** Azmy, Y.Y. (Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 9p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87004250.

From Annual meeting of the American Nuclear Society; Dallas, TX, USA (7 Jun 1987).

This Summary reports recent progress in deriving and numerically implementing a nodal integral method (NIM) for solving the neutron diffusion equation in cylindrical, r-z, geometry. Comparisons of numerical solutions to two test problems with those obtained by the code EXTERMINATOR-2 indicate the superior accuracy of the nodal integral method solutions on much coarser meshes. 6 refs., 1 fig., 1 tab.

34214 **(CONF-870601—5) The bilinear nodal transport method in weighted diamond difference form.** Azmy, Y.Y. (Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 9p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87004251.

From Annual meeting of the American Nuclear Society; Dallas, TX, USA (7 Jun 1987).

The authors describe a highly accurate nodal linear-linear (NLL) scheme, the Bilinear Nodal method, for the two-dimensional neutron transport equation which can be written in a simple, single spatial-weight, weighted diamond difference (WDD) form, so that the final equations can be solved via a WDD algorithm. This result can be generalized to three-dimensional geometries, and higher order spatial approximations. 6 refs., 1 tab. (DWL)

34215 (INIS-mf—10889, pp 48) **Penetration of an electron beam into the polymer and dissipation of energy.** Kral, V.; Pelzbauer, Z. (META, o.p. Svazu Invalidu, Prague, Czechoslovakia; Ceskoslovenska Akademie Ved, Prague. Ustav Makromolekularni Chemie). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

34216 (INIS-mf—10902, pp 19) **Investigations on cosmic radiation produced neutrons in the low atmosphere and the slowing-down process in compact moderating media.** Ledinegg, E.; Mueller, H.; Ninaus, W.; Kahr, G.; Zloebl, H.; Grabner, H. Dec 1986. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702298.

In Annual report (October 1985 - September 1986).

34217 **Characteristics of inelastic interactions of high energy hadrons with atomic electrons.** Qian, S.; Van Ginneken, A. (Fermi National Accelerator Lab., Batavia, IL, USA). *NIMRD;* **256**: No. 2, 285-296(1 May 1987).

The energy loss and angular characteristics of the inelastic interactions of high energy protons and pions (up to 30 TeV) with atomic electrons are analyzed in the electron rest frame. Inclusive distributions of the incident hadron, recoiling electron and produced pions are obtained along with the rms angles of these particles as a function of their momentum. The results are suitably parametrized for use in Monte Carlo simulations. For the incident hadron the average energy loss and rms angle in bulk matter are determined and compared with other processes. The contributiion to dE/dx from inelastic processes exceeds that of competing processes in the multi-TeV regime.

6550 Medical Physics

REFER ALSO TO CITATION(S) 32600, 32601, 32920, 33273, 33517, 33913, 33928

34218 (IAEA-TECDOC—402, pp 55-67) **Some aspects of planning intercomparisons of individual monitors for external radiation exposure.** Boehm, J. (Physikalisch-Technische Bundesanstalt, Braunschweig, Germany, F.R.). Jan 1987. NTIS (US Sales Only), PC A11/MF A01. File Number DE87702284. (CONF-8504302—).

From Technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters; Vienna, Austria (22 Apr 1985).

The work contributes the Federal Republic of Germany's point of view to the discussion of procedures and the collection of data for intercomparisons of individual monitors for external radiation exposure. At present, film dosemeters are most often used to monitor whole body exposures to photon radiation (97%), glass dosemeters play a minor role (3%). Thermoluminescence dosemeters are only used for monitoring partial body exposure. The planning of intercomparisons, both of dosemeter systems and dosemeter services, should be strictly guided by the general objectives of individual monitoring which are summarized. The lack of a translation of these objectives into detailed detector-independent requirements for dosemeter systems makes any intercomparison difficult. It would probably be more efficient to evaluate such requirements prior to any intercomparison. Regarding national activities, an intercomparison of photon dosemeter systems is in progress in which their suitability to measure some recently proposed phantom-related dosimetric quantities is being studied. Another intercomparison of photon dosemeters to study their dose equivalent response for slow neutrons was completed in 1984. The authorized dosemeter services are routinely controlled every year by irradiating samples of 30 photon dosemeters of each type. At present, a recently developed universal neutron dosemeter system is under test by 4 services. 14 references, 4 figures.

34219 (IAEA-TECDOC—402, pp 69-79) **Personnel dosimetry in Finland.** Toivonen, M.; Pukkila, O. (Finnish Centre for Radiation and Nuclear Safety, Helsinki). Jan 1987. NTIS (US Sales Only), PC A11/MF A01. File Number DE87702284. (CONF-8504302—).

From Technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters; Vienna, Austria (22 Apr 1985).

The regulations concerning personnel dosimetry in Finland and the practices of the national monitoring and dose record keeping service are described briefly. The dosimeter used by the service is a combination of film and TL dosimeter. In the nuclear power stations the personnel dosimetry is based on the automatic TLD. In the developments to make the TLD practices of the national service automatic, special attention has been paid to the quality control of the large scale operation. Our solution to the problems is an automatic sort out of dosimeter cards with elevated zero dose background or with too long period from the previous sensitivity check. Attempts to find a system to identify the wearer of the dosimeter in a practical way but with high reliability have not been successful. Therefore, we ask today whether we overestimate the advantages of the automation in servicing more than 1000 customers, each of which has only ten radiation workers on the average. Records are kept on radiation workers including those of the nuclear power stations. Our way to apply the dose limitation system of the ICRP in practical record keeping is described. Further, a practical problem of record keeping when the person is working for several employers is described. 8 references, 1 figure, 1 table.

34220 (IAEA-TECDOC—402, pp 141-146) **Personnel dosimetry in Switzerland. A status report.** Wernli, C.; Valley, J.F.; Jossen, H. (Eidgenoessisches Institute fuer Reaktorforschung, Wuerenlingen, Switzerland; Institut de Radiophysique Appliquee, Lausanne, Switzerland; Schweizerische Unfallversicherungsanstalt, Luzern, Switzerland). Jan 1987. NTIS (US Sales Only), PC A11/MF A01. File Number DE87702284. (CONF-8504302—).

From Technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters; Vienna, Austria (22 Apr 1985).

The organization and the methods of personnel dosimetry in Switzerland are described. The experience over a period of almost 10 years with intercomparisons and performance tests has shown, that a regular organization of intercomparisons helps to improve the quality of personnel dosimetry and proves to be a good tool for establishing confident relations between authorities and dosimetry services. 5 references, 1 figure, 3 tables.

34221 (INIS-mf—10889, pp 41) **Electron beam irradiation of polyethylene in multilayer form.** Jaworska, E. (Institute of Nuclear Chemistry and Technology, Warsaw, Poland). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

34222 (INIS-mf—10889, pp 63) **Dosimetric design and measurements for a 10 kCi irradiation facility.** Oncescu, M.; Ocheana, G.; Ponta, C. (Institutul de Fizica si Inginerie Nucleara, Bucharest, Romania). Apr 1986. NTIS (US Sales Only), PC A05/MF A01. File Number DE87702194. (CONF-8604318—Absts.).

From International meeting on radiation chemistry and processing; Marianske Lazne, Czechoslovakia (21 Apr 1986).

34223 (INIS-mf—10902, pp 18) **Activities in the fields: reactor physics, radiation meteorology and radiation protection.** Mueller, H. Dec 1986. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702298.

In Annual report (October 1985 - September 1986).

34224 (JINR—R-9-85-707, pp 208-213) **Measurement of radiation levels in controlled zone of the U-120 M cyclotron.** Pergl, P. (Ustav Jaderneho Vyzkumu CSKAE, Rez, Czechoslovakia). 1985. (In Russian). NTIS (US Sales Only), PC A16/MF A01. File Number DE87780133. (CONF-8506350—).

From International conference on cyclotrons and their application; Bechine, Czechoslovakia (25 Jun 1985).

Methods and radiation monitoring devices of neutron and γ-radiation of the U-120 M cyclotron are described. Attention is paid to both personal and radiation monitoring. Measurement has been carried out while the cyclotron is operating or being shut down. The measurement results show that the accelerated beams parameters don't lead to exceeding permissible personal radiation doses outside the shields. 3 figs.

6560 Condensed Matter Physics

REFER ALSO TO CITATION(S) 33197, 33205, 33253, 33255, 34047, 34068

34225 (BNL—36214) Sub-surface defects studied by variable energy positrons. Nielsen, B.; van Veen, A.; Lynn, K.G. (Brookhaven National Lab., Upton, NY (USA)). Jan 1985. Contract AC02-76CH00016. 4p. (CONF-850169—23). NTIS, PC A02. File Number DE87010074.

From 7. international conference on positron annihilation; New Delhi, India (6 Jan 1985).

Defects produced by 3 keV He^+ and 3 keV Ar^+ ion bombardment in Mo(100) have been monitored by variable energy positrons (0.1 to 25 keV). The measured positron parameters were the positronium fraction f/sub ps/ and the Doppler broadening parameter S. The sensitivity has a lower limit at 1×10^{13} defects cm^{-2}. The mean depth of the defects can be derived by fitting to results of model calculations. The effect of internal positron reflection, negligible for a defect free crystal, becomes of importance when sub-surface defects are present.

34226 (LA-UR—87-1294) Smoke clearing by high energy laser beams. Chitanvis, S.M.; Gerstl, S.A.W.; Zardecki, A. (Los Alamos National Lab., NM (USA)). 10 Apr 1987. Contract W-7405-ENG-36. 10p. (CONF-8704122—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE87009000.

From Smoke/obscurants symposium; Laurel, MD, USA (21 Apr 1987).

We describe the clearing phenomenon that occurs when a continuous wave (CW) high energy laser beam, incident upon a cloud of hygroscopic droplets, vaporizes these droplets. We consider the case when the incident wavelength is greater than the average droplet radius. Williams' model is used to describe the vaporization of a single droplet. The propagation of the laser beam is described by the radiative transfer equation in a slab geometry. The radiative transfer equation is solved using the method of successive orders of scattering.

34227 (LBL—22924) Microanalysis of polytypoid ceramics by imaging, diffraction and spectroscopy. Krishnan, K.M.; Thomas, G. (Lawrence Berkeley Lab., CA (USA)). Feb 1987. Contract AC03-76SF00098. 12p. (CONF-870733—2). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87007599.

From Pacific workshop and meeting on analytical electron microscopy; Kona, HI, USA (12 Jul 1987).

Combined atomic resolution imaging, microdiffraction and energy dispersive x-ray microanalysis suggest that the 32H polytypoid in the AlN-Al_2O_3 pseudobinary system is in fact a 7:9 periodic intergrowth of the 21R and 27R polytypoids. Furthermore, these combined techniques verify that the cation/anion ratio is 16/17 and that this ratio defines the polytypoid precisely.

34228 (LBL—23258) Ab initio calculation of ground- and excited-state properties of surfaces. Louie, S.G. (Lawrence Berkeley Lab., CA (USA)). Apr 1987. Contract AC03-76SF00098. 10p. (CONF-8704127—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009551.

From Asia Pacific symposium on surface physics; Shanghai, China (14 Apr 1987).

A new approach for surface studies using the density functional formalism for structural determination and a first principles many-body theory for the quasiparticle surface state energies is discussed. The many-body calculation involves the evaluation of the electron self-energy operator including both local fields and dynamical screening effects. Results for the Ge(111):As and Si(111):As surface are in excellent agreement with recent angle-resolved photoemission data and show a substantially larger gap between the empty and occupied surface states in comparison to local density functional calculations.

34229 (SAND—87-0260C) A comparison of matrix correction procedures for the x-ray microanalysis of U-Nb alloys. Romig, A.D. Jr.; Hlava, P.F.; Chambers, W.F. (Sandia National Labs., Albuquerque, NM (USA)). 1987. Contract AC04-76DP00789. 14p. (CONF-870725—6). NTIS MF A01; 2; GPO Dep. File Number DE87006133.

From 22. annual meeting of the Microbeam Analysis Society; Kailua-Kona, HI, USA (13 Jul 1987).

The objective of this study is to evaluate the quantification accuracy of the two matrix correction procedures, ZAF and "empirical" phi(rho z). A series of homogeneous U-Nb alloys (1 to 12 wt. % Nb) were analyzed at several accelerating voltages (10 to 40 kV) and their compositions determined using the two correction algorithms. Pure element standards were used to make the comparison between the two correction procedures as rigorous as possible. The quantification results are compared to known compositions determined by wet chemical analytical techniques. The x-ray microanalysis results are then examined to evaluate the relative accuracy of the two techniques and any dependence on the electron beam energy. (WRF)

34230 Fluctuation method for calculation of elastic constants of solids. Pratt, L.R. (Chemical and Laser Sciences Division, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Journal of Chemical Physics;* **87**: No. 2, 1245-1247(15 Jul 1987). Contract W-7405-ENG-36.

This paper derives a method for calculation of the elastic constants of a solid from computer simulation data on atomic displacement correlations at long range. It is shown that principal axes of the elastic constant tensor can be found from a Fourier analysis of the second-rank tensor of displacement correlations together with a numerical search in the reciprocal Fourier k space. The full fourth-rank tensor of elastic constants then can be obtained by rotations after the principal values are calculated. The method is not limited to special crystal symmetries, to pair-decomposable forces, to low temperatures, to thermodynamic states of only slight distortion from the minimum energy configuration, or to harmonic systems.

34231 Energy and momentum transport by sputtered and reflected streams in a glow discharge. Gras-Marti, A.; Valles-Abarca, J.A.; Bensaoula, A. (LCFCAS, Departament de Fisica, Facultat de Ciencies, Universitat d'Alacant, Apt. 99, E-03080 Alacant (Alicante), Spain). *Journal of Vacuum Science and Technology, A: Vacuum, Surfaces, and Films;* **5**: No. 4, 2217-2221(Jul 1987).

Extending established concepts from the field of atomic collisions in solids we evaluate, for planar geometry, the spatial profile of the energy deposited in the gas phase by the streams of particles emitted at the cathode. Both sputtered and reflected energetic streams are considered. It is estimated, also, the pressure profile due to the transport of momentum both by the emitted streams, and by the elastic collision cascades generated by them. The analysis of the transport of momentum and matter is useful for a quantitative understanding of the dynamic rarefaction which is measurable in the vicinity of the cathode in a glow discharge.

34232 Structure and diffracted intensity in a model for irreversible island-forming chemisorption with domain boundaries. Evans, J.W.; Nord, R.S. (Ames Laboratory and Department of Chemistry, Iowa State University, Ames, Iowa 50011). *Journal of Vacuum Science and Technology, A: Vacuum, Surfaces, and Films;* **5**: No. 4, 1040-1044(Jul 1987). Contract W-7405-ENG-82.

Despite the awareness that island-forming chemisorption is often kinetically limited and intrinsically nonequilibrium, there is little sophisticated analysis of the corresponding island structure or diffracted intensity. Here we analyze a model where species irreversibly and immobilely chemisorb (commensurately) from a precursor source, with distinct rates for island nucleation (chemisorption in an empty region) and growth (chemisorption at island perimeters), the latter rates being larger. Specifically, we consider the formation of one-dimensional double-spaced islands, and two-dimensional checkerboard C(2 x 2) islands on a square lattice. In both cases (permanent) domain boundaries form between out-of-phase is-

lands. We analyze scaling of the saturation coverage, a characteristic linear island dimension, spatial correlations, etc., with the ratio of growth to nucleation rates. The structure of individual islands, and of the saturation domain boundary "network" are elucidated. The corresponding diffracted intensity exhibits significant interference at superlattice beams, and diminution at integral order beams as saturation is approached.

34233 **Localized eigenstates of one-dimensional tight-binding systems: A new algorithm.** Luban, M.; Luscombe, J.H. (Ames Laboratory and Department of Physics, Iowa State University, Ames, Iowa 50011). *Physical Review [Section] B: Condensed Matter;* **35**: No. 17, 9045-9055(15 Jun 1987). Contract W-7405-ENG-82.

We present a new numerical algorithm capable of determining the localized eigenstates and their energies for the general class of one-dimensional nearest-neighbor tight-binding models to arbitrarily high accuracy. This algorithm completely overcomes the numerical instability originating in a growing solution which inevitably accompanies a localized solution. It is also free of the ambiguity of the Economou-Cohen method.

34234 **Compact He-atom detector for high-resolution surface phonon measurements.** Martini, K.M.; Franzen, W.; El-Batanouny, M. (Department of Physics, Boston University, Boston, Massachusetts 02215). *Review of Scientific Instruments;* **58**: No. 6, 1027-1037(Jun 1987).

A new compact detector for measuring the velocity distribution of He atoms scattered from an oriented single-crystal surface by the time-of-flight (TOF) method is described. In this system the scattered atoms are tagged by exciting them to the 2^3S metastable state by cross bombardment with a pulsed electron beam. After traversal of a given flight path (80.9 mm), the metastables are detected by a multichannel-plate electron multiplier, and their TOF distribution is recorded. The incident supersonic He beam is generated by a nozzle source, resulting in a very narrow energy distribution of the incident beam. The angular and energy resolutions of the detector are analyzed and its advantages and limitations are described. Finally, a demonstration of the performance of the instrument in inelastic scattering from a Cu(100) surface is presented.

6561 Superconductivity

REFER ALSO TO CITATION(S) 33160

34235 (INIS-mf—10902, pp 10) **Theory of superconductivity.** Schachinger, E.; Prohammer, M.; Triebelnig, D.; Langmann, E.E. Dec 1986. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702298.

In Annual report (October 1985 - September 1986).

34236 **Critical temperatures of superconductors with low dimensionality.** Kresin, V.Z. (Materials and Molecular Research Division, Lawrence Berkeley Laboratory, University of California, Berkeley, California 94720). *Physical Review [Section] B: Condensed Matter;* **35**: No. 16, 8716-8719(1 Jun 1987).

The superconducting state of a two-dimensional electron gas in the presence of a subgroup with a high density of states (DOS) is studied. It is shown that in this system a strong electron-phonon coupling arises; in addition, an important role is played by two-dimensional plasmons. The theory is applied to a description of the properties of the recently discovered class of materials with high T/sub c/. Their low dimensionality and the presence of groups with high DOS makes these materials unique.

6570 Theoretical And Mathematical Physics

REFER ALSO TO CITATION(S) 34038, 34095, 34135, 34136, 34137, 34138, 34139, 34141, 34149, 34429

34237 **(CEA-CONF—8314) Chiral limit in lattice QCD.** Morel, A. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Inst. de Recherche Fondamentale (IRF)). Nov 1985. 8p. (SPhT—86-001; CONF-8511170—4). NTIS (US Sales Only), PC A02/MF A01. File Number DE87751806.

From Lattice gauge theory: a challenge in large scale computing conference; Wuppertal, F.R. Germany (5 Nov 1985).

Using the results of a quenched SU(2) simulation with staggered fermions, we discuss the small quark mass behaviour of m/sub π//sup 2/ and f/sub π//sup 2/. The importance of finite size effects and of non linearities in the zero mass extrapolation is emphasized. Evidence for scaling of m/sub π//sup 2/ and of a suitably determined value of f/sub π//sup 2/ is presented.

34238 **(CEA-CONF—8775) Stochastic quantization and B.R.S. symmetry.** Zinn-Justin, J. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Inst. de Recherche Fondamentale (IRF)). Jul 1986. 5p. (CONF-860701—83). NTIS (US Sales Only), PC A02/MF A01. File Number DE87751811.

From 23. international conference on high-energy physics; Berkeley, CA, USA (16 Jul 1986).

For renormalization purpose, it is useful to associated with dynamical equations like the Langevin equation, an effective field theory action. We show that as in various other cases like gauge field theories, or random field Ising model this action is automatically B.R.S. symmetric. In addition in special cases we recover that the effective action can have a second B.R.S. symmetry or even supersymmetry.

34239 (INIS-mf—10902, pp 9) **Quantum mechanics and quantum field theory of a fermion system.** Bulla, W.; Unterkofler, K. Dec 1986. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702298.

In Annual report (October 1985 - September 1986).

34240 **(JINR-E—2-86-268) Quantum motion on two planes connected at one point.** Exner, P.; Seba, P. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 6p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702331.

Free motion of a particle on the manifold which consists of two planes connected at one point is studied. The four-parameter family of admissible Hamiltonians is constructed by self-adjoint extensions of the free Hamiltonian with the singular point removed. The probability of penetration between the two parts of the configuration manifold is calculated. The results can be used as a model for quantum point-contact spectroscopy. 11 references.

34241 **(JINR-E—2-86-432) Tables and graphs of oscillator spheroidal functions.** Kul'chitskij, Yu.A.; Lutsenko, I.V.; Pogosyan, G.S.; Ter-Antonyan, V.M.; Sisakyan, A.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 73p. NTIS (US Sales Only), PC A04/MF A01. File Number DE87702335.

In the paper, we summarize, in the form of tables and graphs, the results of computer calculations of radial functions of an oscillator in prolate and oblate spheroidal coordinates. Spheroidal constants depend on an extra parameter defining the spheroidal coordinates. 5 figures, 6 tables.

34242 **(JINR-E—4-86-242) One-dimensional anharmonic oscillator.** Afanas'ev, G.N.; Gal'perin, A.G. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 11p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702337.

We have obtained, in a closed form, the energy levels of a one-dimensional anharmonic oscillator (a.o.) $ax^3+\beta x^4$ using the 1st order of the so-called modified perturbation theory (MPT) as well

as WKB method. The calculations were performed for a broad range of the anharmonic constant β and energies. We prove that inaccuracy of the 1st order MPT for positive harmonic constant is not worse than 1-2%. We note that MPT final expressions are much simpler. Contrary to the WKB method there is no need in the preliminary solution of the transendental equation. A particularly simple formula is obtained for the energy levels of the pure quartic oscillator. It is found that for $a < 0$ and negative energies MPT is not satisfactory. On the other hand WKB method reasonably describes the energy levels and their splitting at the bottom of the potential well. We conclude that these methods complement each other. 11 references, 3 figures, 3 tables.

34243 **(JINR-E—11-86-266) Deterministic computation of functional integrals in application to quantum mechanical problems.** Gregus, M. Jr.; Lobanov, Yu.Yu.; Sidorova, O.V.; Zhidkov, E.P. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation). 1986. 18p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702340.

Submitted to the International Congress on Computational and Applied Mathematics (Leuven, Belgium, Jul 1986).

New approximate formulae for functional integrals with the Gaussian measure in separable Frechet spaces are derived. As a special case, the integration with respect to the conditional Wiener measure is investigated. For conditional Wiener integrals a family of approximate formulae with weight is constructed. The quantum mechanical models, namely the linear and the anharmonic oscillators, are described. The efficiency of the formulas is demonstrated in the numerical comparison with the Monte Carlo method on lattice. 18 references, 4 figures.

34244 **(JINR-R—2-86-116) Initial contribution to the explanatory dictionary for gravitationalists.** Chernikov, N.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702351.

Attention is drawn to inconsistency in the terminology of relativity theory and gravity and to the necessity of composing the explanatory dictionary for gravitationalists. The following concepts are interpreted: covariance, invariance, the principle of relativity, simple manifold and its global maps, the introduction on a simple manifold of the structure of affine space. All this is necessary for a correct under-standing of the nature of the energy-momentum pseudotensor. 15 references.

34245 **(JINR-R—2-86-202) Integration of nonlinear evolution equations.** Mel'nikov, V.K. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 20p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702352.

The system of linear integral equations is found. It is used to derive explicit expressions for solutions of some nonlinear evolution equations. These equations describe the unteraction of waves on the x, y plane and are applied for some problems of mathematical physics. 21 references.

34246 **(JINR-R—2-86-436) Some interbasis expansions in a four-dimensional isotropic oscillator.** Mardoyan, L.G.; Pogosyan, G.S.; Ter-Antonyan, V.M.; Sisakyan, A.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 28p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702362.

Exact formulae are obtained for the explicit form of coefficients connecting the Cartesian, double polar and two hyperspherical bases of a four-dimensional isotropic ocsillator. Tables for the coefficients are compiled. 19 references, 18 tables.

34247 **(JINR-R—2-86-470) Manifestation of the elongation formula.** Strel'tsov, V.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1986. 10p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702363.

It is shown that additional consideration of the influence of the Earth's motion on the velocity of light propagation along the transverse are of an interferometer when interpreting the known experiment of Michelson - Morley leads to the elongation formula for longitudinal arm. The problems of further manifestation of relativistic elongation formula are discussed when considering the interaction of moving charged particles in an ondulator, crystal and resonator. The latter formula is a consequence of the concept of relativistic length based on radar method for measuring distances. 10 references, 4 figures.

34248 **(JINR-R—4-86-346) Low energy scattering of charged particles on a polarized target.** Pupyshev, V.V.; Solovtsova, O.P. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 12p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702365.

The S-wave function, phase-shift, and cross sections of slow particle scattering by a superposition of nuclear and Coulomb field containing the polarization interaction are explored in the framework of the WKB-method. It is shown that at sufficient low energies it is certainly necessary to take into account this interaction. The way of evaluation of an upper bound of the energy interval where the polarization effects play an essential role is proposed. 21 references, 6 figures.

34249 **(JINR-R—4-86-442) Innerse scattering problem for deformed three-dimensional potentials.** Zakhar'ev, B.N.; Funke, H. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702367.

Submitted to the journal Phys. Lett., B.

The inverse problem for axial-deformed potentials which allow the separation of variables in the Schroedinger equation in spheroidal coordinates is formulated for a pure discrete spectrum; R-matrix scattering theory and confinement potential wells. The same formalism is suggested to apply for reconstructing potentials for which the variables are separated in ellipsoidal coordinates (three-axial deformation). 13 references.

34250 **(JINR-R—4-86-554) Three-body inverse scattering problem.** Zakhar'ev, B.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1986. 14p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702370.

Submitted to the journal Few-Body Systemsand to the Organizing Committee of International Conference on Back-Verse Problems, France, Dec 1986.

A method for determining the three-body (and two-body if necessary) potentials from scattering data on the three-particle systems is suggested. The reduction of the three-body Schroedinger equation to the system of ordinary differential (not integrodifferential as usual in the direct problem) equations is used. A simple method to solve the multidimensional inverse problem in the finite-difference approximation is considered. 10 references, 4 figures.

34251 **(JINR-R—11-86-526) Arithmetic operations with long integers on ES computers for calculating matrix elements in quantum mechanics.** Pojda, V.Yu.; Rostovtsev, V.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation). 1986. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702380.

A long integer algorithm is described. It is based on ES Fortran language. The necessity to keep much more than sixteen decimal digits appears in some calculations, in particular, when alternating sums are calculated where summands are bigger than sums themselves. The proposed algorithm is general for these tasks. It can be used in calculations of special functions and matrix elements in quantum mechanics. 8 references.

34252 **(UCRL—95835) Computational issues in electromagnetic coupling to a slit cylinder enclosing an off-set cylinder.** Schmucker, R.F.; Ziolkowski, R.W. (Lawrence Livermore National Lab., CA (USA)). Jan 1987. Contract W-7405-ENG-48. 11p. (CONF-870487—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87006686.

From ARRAY conference; Montreal, Canada (26 Apr 1987).

The canonical scattering and aperture coupling problem of a plane wave incident upon a slit cylinder enclosing another off-set cylinder has been analytically solved using a dual series approach. The solution expressions are nested sums involving Bessel functions. Numerical evaluation of the physical quantities of interest (bistatic radar cross sections, induced currents, and induced fields) typically requires Bessel functions for thousands of arguments, and several hundred orders at each argument. Thus, the execution time of the Bessel function routines becomes critical. A comparison of the timing and accuracy of the new FPS Bessel function software with other non FPS Bessel function routines will be given. In addition, there are two major considerations in developing graphics post-processing routines to display the solutions which result from this modeling. First, there is a large number of different system geometries and incident field conditions to model, each with its own computed solutions. Secondly, cross-comparisons of different physical quantities are desired to help develop an understanding of the relevant physics. These post-processing needs have required the development of several new graphics display methods. A variety of examples from this canonical coupling problem will be given to demonstrate the efficacy of these graphical display routines.

34253 **(UWThPh—1986-31) Classical strings and minimal surfaces.** Urbantke, H. (Vienna Univ. (Austria). Inst. fuer Theoretische Physik). 1986. 10p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702407.

Real Lorentzian forms of some complex or complexified Euclidean minimal surfaces are obtained as an application of H.A. Schwarz' solution to the initial value problem or a search for surfaces admitting a group of Poincare transformations.

34254 **(UWThPh—1986-40) Dynamical entropy of C/sup */ algebras and Von Neumann algebras.** Connes, A.; Narnhofer, H.; Thirring, W. (Vienna Univ. (Austria). Inst. fuer Theoretische Physik). 1986. 46p. NTIS (US Sales Only), PC A03/MF A01. File Number DE87702409.

The definition of the dynamical entropy is extended for automorphism groups of C/sup */ algebras. As example the dynamical entropy of the shift of a lattice algebra is studied and it is shown that in some cases it coincides with the entropy density.

34255 **(UWThPh—1987-3) Dynamical entropy of quantum systems.** Connes, A.; Narnhofer, H.; Thirring, W. (Vienna Univ. (Austria). Inst. fuer Theoretische Physik). 1987. 39p. NTIS (US Sales Only), PC A03/MF A01. File Number DE87702411.

The definition of the dynamical entropy for automorphisms of C/sup */ - algebras is represented. Several properties are discussed; especially it is argued that the entropy of the shift can be shown in special cases to be equal with the entropy density.

34256 **(UWThPh—1987-5) Asymptotics of the nodal lines of solutions of 2-dimensional Schroedinger equations.** Hoffmann-Ostenhof, M. (Vienna Univ. (Austria). Inst. fuer Theoretische Physik). 1987. 29p. NTIS (US Sales Only), PC A03/MF A01. File Number DE87702412.

Results on nodal properties of L^2 solutions of two-dimensional Schroedinger equations obtained in a previous paper are refined. The generally unbounded nodal set of psi is investigated for r -> ∞ and shown that in this limit the nodal set consists of non-intersecting nodal lines which look asymptotically either like straight lines or like branches of parabolas. (G.Q.).

34257 **Effect of numerical aperture on signal level in cylindrical waveguide evanescent fluorosensors.** Glass, T.R.; Lackie, S.; Hirschfeld, T. (Lawrence Livermore National Laboratory). *Applied Optics;* **26**: No. 11, 2181-2187(1 Jun 1987).

The effect of numerical aperture on signal level from fluorescent substances or solutions in the evanescent zone of a cylindrical waveguide is analyzed. The analysis applies to the case in which the fluorescence is excited by the evanescent wave of a fiber and the fluorescence signal is that which tunnels back into the same fiber. The analysis is for two cases: bulk fluorescence and fluorescence of a thin film layer. Experimental results are also presented.

34258 **Classical simulation of the Fermi gas.** Dorso, C.; Duarte, S.; Randrup, J. (Lawrence Berkeley Lab., CA, USA). *Physics Letters [Section] B;* **188**: No. 3, 287-294(16 Apr 1987).

We demonstrate that it is possible to approximate the one-particle phase-space distribution of the excited Fermi gas within the framework of classical mechanics by employing a momentum two-body repulsion, to simulate the Pauli exclusion principle. For a suitable choice of the parameters in this potential, it is possible to achieve a quite good approximation to the momentum distribution over a broad range of temperatures and densities.

34259 **Standing and traveling waves for nonlinear wave equations.** Weinstein, A. (Department of Mathematics, University of California, Berkeley, CA 94720, USA). *Transport Theory and Statistical Physics;* **16**: No. 2, 267-278(Mar 1987).

The aim of this talk will be to present results, many of them obtained jointly with A. Floer, on the existence and stability of standing and traveling wave solutions for nonlinear equations of Schroedinger and Klein-Gordon type. Exphasis will be placed on situations other than the flat, spatially homogeneous ones which have usually been studied in the past; in particular, equations with a potential or with spherical geometry will be considered. The relation between the hamiltonian structures for waves and particles will be discussed.

34260 **Electrically and mechanically induced macroscopic body couple, a newly recognized phenomenon of electromechanical interaction.** Chen, P.J. (Sandia National Labs., Albuquerque, NM). *Nuovo Cimento della Societa Italiana di Fisica, [Sezione] D: Condensed Matter, Atomic, Molecular and Chemical Physics, Biophysics;* **8**: No. 5, 481-496(Nov 1986).

Microscopically, when the molecules of certain materials are under the influence of external stimuli such as mechanical and electrical forces, several process can happen. In particular, the centers of charge of the positive and negative ions of a molecule may displace with respect to each other. This notion leads to the macroscopic concept of polarization which has been exploited in the classical studies of piezoelectric and ferroelectric materials. In addition, the ions of the molecule may also rotate angularly relative to one another. Here an entirely new macroscopic concept of body couple which differs from the classical concept is introduced. It is shown that the simplest representations of the proposed constitutive relations lead to an equation within the context of the classical bending theory of thin plates whose solution is in remarkable agreement with recent experimental results concerning the bending of thin virgin ferroelectric ceramic discs under the action of small d.c. voltages. These experimental results cannot be explained by the classical notion of polarization. Therefore, the concept of macroscopic body couple introduced here is a fundamental feature which must be taken into account in the considerations of electromechanical interactions.

70 FUSION ENERGY

REFER ALSO TO CITATION(S) 34156

7001 Plasma Research

REFER ALSO TO CITATION(S) 33366, 33370, 33465, 33505, 34024, 34035, 34363, 34364

34261 **(CONF-870570—6) Global ICRF modeling in large non-circular tokamak plasmas with finite temperature.** Jaeger, E.F.; Batchelor, D.B.; Weitzner, H.; Colestock, P.L. (Oak Ridge National Lab., TN (USA); New York Univ., NY (USA). Courant Inst. of Mathematical Sciences; Princeton Univ., NJ (USA). Plasma Physics Lab.). 1987. Contract AC05-84OR21400. 4p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009670.

From 7. topical conference on applications of radio-frequency power to plasmas; Kissimmee, FL, USA (4 May 1987).

Full wave ICRF coupling calculations in two- and three dimensions have been extended to treat tokamaks with non-circular

flux surfaces and conducting boundaries. The magnetic field configuration is derived from a Solovev equilibriium with finite poloidal magnetic fields. The conducting boundary may be of arbitrary shape. The mode conversion model is that of Colestock et al., in which the fourth order finite temperature wave equation is reduced to a second order equation which describes the effects of mode conversion on the fast wave but neglects the detailed structure of the ion Bernstein wave. Results show the effect of non-circular cross section on excitation, wave propagation, and absorption in Doublet III-D and JET. Also, in the limit of circular cross section, toroidal phasing of the resonant double loop antenna design for TFTR is studied.

34262 **(CONF-870570—7) Second harmonic electron cyclotron heating calculations for the ATF [Advanced Toroidal Facility] torsatron.** Goldfinger, R.C.; Batchelor, D.B. (Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 5p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009666.

From 7. topical conference on applications of radio-frequency power to plasmas; Kissimmee, FL, USA (4 May 1987).

The heating of the Advanced Toroidal Facility now under construction at Oak Ridge National Laboratory has been investigated using ray tracing techniques. The effect of electron cyclotron waves at the second harmonic resonance is studied using the RAYS geometrical optics code assuming anticipated steady state parameters. A comparison is made of the heating efficiency using two launching schemes: a linearly polarized antenna providing a narrow beam and a T E_{01} waveguide. The first pass ray tracing calculations are incorporated in a wall reflection/power balance model which includes the effects of wall reflected rays and wall losses. It is shown that the power absorbed in the plasma after multiple reflections is preferentially absorbed near the center of the plasma. A significant fraction of the incident power is predicted to ultimately be deposited in the plasma, rather than lost to walls and ports.

34263 **(DOE/ER/53198—105) Studies of large, non-circular, reversed field pinch discharges.** Almagri, A.; Assadi, S.; Dexter, R.N.; Prager, S.C.; Sarff, J.S.; Sprott, J.C. (Wisconsin Univ., Madison (USA). Dept. of Physics). Apr 1987. Contract FG02-85ER53198. 30p. NTIS, PC A03/MF A01; GPO Dep. File Number DE87009102.

Reversed field pinch discharges have been produced in a large (1.39 meter major radius, 0.56 meter average minor radius), thick-walled (5 cm), aluminum vacuum vessel with indented sides. The discharges are self-reversed and ramped up to a current of 300 kA over a time of 10 ms. Reversal is sustained for $\geq$ 10 resistive diffusion times, despite the presence of large magnetic fluctuations. The influence of the bad poloidal magnetic curvature on RFP stability is examined by measurement of magnetic fluctuations near the plasma edge in the separate bad and good curvature regions of the noncircular plasma for RFP and non-reversed discharges with edge safety factor of 0.4 and 1.4. For q $\sim$ 1.4 discharges, poloidal field curvature should be small. The large size permits RFP startup at a low toroidal loop voltage ($\leq$ 200 V), which is applied to a gap exposed to plasma, but successfully protected against arcing (up to 300 V). RFP plasmas have also been obtained with toroidal limiters.

34264 **(DOE/ER/53222—94) MHD simulation of Columbia HBT.** Li, X.L. (Columbia Univ., New York (USA). Plasma Physics Lab.). 1987. Contract FG02-86ER53222. 133p. NTIS, PC A07. File Number DE87010238.

The plasma of Columbia High Beta Tokamak (HBT) is studied numerically by using the two dimensional resistive MHD model. The main object of this work is to understand the high beta formation process of HBT plasma and to compare the simulation with the experiments. 21 refs., 48 figs., 2 tabs.

34265 **(DOE/ER/53236—6) Tandem mirror ICRF [ion cyclotron range of frequency] and SRX [Second Region Experiment] physics analyses: Progress report for period August 15, 1986-April 14, 1987.** (Grumman Corp., Plainsboro, NJ (USA). Aircraft Systems Div.). Apr 1987. Contract FG02-86ER53236. 74p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87009655.

The ICRF electromagnetic fields are solved for an axisymmetric mirror plasma. For these calculations a numerical code that solves for global wave solutions of the cold plasma wave equation is used. The resulting radial ponderomotive force is evaluated and its possible impact on MHD stability is discussed. The slow wave is always found to be present and dominates the electric field structure when $\omega < \Omega$/sub ci min/. The radial ponderomotive force is stabilizing when $\omega > \Omega$/sub ci min/ but becomes destabilizing at higher densities and driving frequencies. So called low n 'infernal' modes which reflect a breakdown in standard ballooning theory at low shear in presence of significant pressure gradients have been codiscovered. Intermediate n infernal behavior is found to set the most stringent requirement for second region access and operation. Access to the high β, second region of MHD stability has been studied for large aspect ratio (A > 6) near circular cross section tokamak geometry. Evolving high $\epsilon\beta$phi equilibria generated by a 1-1/2D Transport code have been analyzed for both high and low n, internal and external mode stability. Neutral beam induced current programming is shown to modify the shear profile and to drive q on axis significantly above unity. This reduces the radial extent of the unstable zone which develops and the time required to cross it, thus reducing the demands on alternate stabilization mechanisms. These calculations show transition to the second region when $\epsilon\beta$phi $\geq$ 1. An enhanced transport model, triggered locally by n = ∞ unstable flux surfaces, suggests that controlled transition to the second region is possible solely with current profile programming that raises $q_0 \geq 1.5$ at plausible auxiliary heating power levels ($\sim$3.5 MW) for SRX parameters. 25 refs., 30 figs., 5 tabs.

34266 **(DOE/ET/53053—T2) Theoretical and numerical studies in magnetic mirror fusion: Final report.** Schultz, M.; Bernstein, I. (Yale Univ., New Haven, CT (USA)). 18 Mar 1987. Contract AC02-77ET53053. 8p. NTIS, PC A02/MF A01; GPO Dep. File Number DE87008951.

The theory of the propagation of small amplitude waves via the linearized Maxwell and kinetic equations leads to a large system of differential equations. A constructive procedure has been developed for the systematic reduction in order of the system. Mode coupling and mode conversion enter in a natural way. For the case of transverse waves propagating parallel to the magnetic field the analytic results are in excellent agreement with the results of a numerical solution. The formal theory of geometric optics in magnetized plasmas has been shown to require a reinterpretation of the "dielectric tensor" $\sigma(\kappa,\omega,r,t)$ which occurs in the theory. It has been demonstrated by a direct treatment of the linearized Vlasov equation and the Maxwell equations that $\sigma(\kappa,\omega,r,t)$ must be interpreted not merely as the dielectric constant of an infinite homogeneous plasma which everywhere has the properties that the real plasma displays at the point r,t in question, but that corrections first order in the small parameter wave length over scale length must be added. These change the transport equation for the amplitude of the field, and affect such issues as electron cyclotron absorption.

34267 **(DOE/OR/00033—T306) Whistler mode electron cyclotron resonance heating and emission in a magnetic mirror plasma.** Booske, J.H. (Michigan Univ., Ann Arbor (USA). Dept. of Nuclear Engineering). Jun 1985. Contract AC05-76OR00033. 548p. John H. Booske, Dept. of Nuclear Engineering, Univ. of Michigan, Ann Arbor, MI 48109. File Number TI87009217.

An experimental investigation has been conducted in which whistler mode electron cyclotron heating (ECRH) was performed simultaneously with whistler mode electron cyclotron emission measurements on an axisymmetric magnetic mirror plasma. Results presented include theoretical and experimental studies of the early plasma startup phase, as well as experimental studies of two instability phases. These instabilities are identified as a whistler instability and a magnetohydrodynamic (MHD) flute instability. 115 figs., 8 tabs.

34268 (EUR—9618-Vol.1, pp 259-277) **Impurity transport studies in Wendelstein VII-A.** Sardei, F.; Cattanei, G.; Dorst, D. May 1986. NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803. (CONF-8409392—Vol.1).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

The transport behaviour of impurities in typical net current free neutral beam heated plasmas in W VII-A has been studied for both oxygen as the main plasma impurity and Al as a tracer impurity /1/. Comparison with a 1D impurity transport and radiation code /2/ shows that the main features of the impurity transport are consistent with neoclassical predictions. Some details, however, seem to require additional anomalous transport during short time intervals. This may be due to a distortion of the magnetic configuration around resonant magnetic surfaces induced either by pressure driven currents or by modulations of the helical field. An oxygen influx from the walls at least of the same order of magnitude as the oxygen influx from the neutral injection (— 3 x 10/sup 18/ s/sup -1/) has to be assumed in order to explain the measured central oxygen radiation. Discharges with cold gas feed, which lead to broad plasma density profiles, indicate a substantial reduction of the central impurity radiation. Also the calculated central impurity density is considerably smaller in this case. No conclusive evidence for a different impurity transport behaviour for co- and counter- neutral beam injection has been found. This is probably due to the almost perpendicular neutral injection.

34269 (EUR—9618-Vol.1) **Proceedings of the IAEA Technical committee meeting on Plasma Confinement and Heating in Stellarators.** Rau, F.; Leotta, G.G. (eds.). (Commission of the European Communities, Luxembourg). 1985. 432p. (CONF-8409392—Vol.1). NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803.

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

The volume 1 of these workshop proceedings gathers some overview articles on experimental results, some articles on topical details of experiments, including interpretation (articles on heating, transport and impurities gathered separately), and some articles on equilibrium and stability. Heliotron-E group, L-2 team, IMS, Proto-Cleo and TSL program, Sheila Heliac, Wendelstein 7.A, Cleo stellarator are the more specific groups or devices participating to this volume.

34270 (EUR—9618-Vol.1, pp 281-289) **Summary of Australian theoretical work on heliacs.** Dewar, R.L.; Sy, W.N.-C.; Gardner, H.J. 1985. NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803. (CONF-8409392—Vol.1).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

The problem of defining an optimal set of magnetic coordinates for equilibria not possessing perfect nested surfaces is addressed. A variational principle is proposed, and the minimization is carried out in the simple special case of a single island chain. An algorithm is being developed to solve the ideal equilibrium equations for helically symmetric plasma with a free boundary. The solution for the fields inside and outside a fixed plasma boundary have been published by other authors. This new iterative technique evaluates the contribution of a fictitious skin current which is "induced" on any guessed plasma boundary which is not that demanded by the matching of the interior and exterior fields. A class of exact analytic equilibrium solutions has been obtained for the helically symmetric heliac. These equilibria are connected continuously to the vacuum configuration of the standard heliac.

34271 (EUR—9618-Vol.1, pp 291-299) **Pressure induced islands in three-dimensional toroidal plasma.** Cary, J.; Kotschenreuther, M. 1985. NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803. (CONF-8409392—Vol.1).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

The production of magnetic islands by the introduction of plasma pressure into nonaxisymmetric confinement configurations is analyzed, assuming scalar pressure. Far from the rational surfaces a procedure based on linearization in β applies. Singularities at the resonant surfaces are resolved with a nonlinear analysis. Scaling is found by using the approximation of nearly circular flux surfaces. Island size depends dramatically on whether or not a magnetic well is present. If a magnetic hill is present, islands overlap for arbitrarily low pressure.

34272 (EUR—9618-Vol.1, pp 301-315) **Development and application of expansion techniques for MHD equilibrium and stability studies in conventional stellarators, torsatrons, and heliacs/sup +/.** Johnson, J.L.; Rewoldt, G.; Koniges, A.E.; Kuo-Petravic, G. 1985. NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803. (CONF-8409392—Vol.1).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

The stellarator expansion, a large-aspect-ratio ordering with the multipolar field amplitude tied to the aspect ratio, reduces stellarator equilibrium studies to two dimensional problems. It thus provides the possibility of understanding the physics involved better than in more extensive numerical studies and can serve as a fast and useful design tool.

34273 (EUR—9618-Vol.1, pp 47-74) **Recent results from IMS, Proto Cleo and the TSL theory program (Torsatron-Stellarator Laboratory Team).** Shohet, J.L. 1985. NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803. (CONF-8409392—Vol.1).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

This paper is divided into four sections, IMS results, including magnetic surface measurements, ECH breakdown characteristics, and divertor action, Proto-Cleo results, including measurements of the Pfirsch-Schlueter current and bootstrap currents, theory, including anisotropic pressure stability results, and bounce-averaged Monte-Carlo transport code development. Finally, the Proto-Cleo torsatron has been used to measure equipotential contours and possible modifications to the configuration to improve its topology.

34274 (EUR—9618-Vol.1, pp 79-109) **Status of Wendelstein VII-A.** Renner, H. 1985. NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803. (CONF-8409392—Vol.1).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

The investigations at the WENDELSTEIN have been concentrated on the description of transport, heating and stability of "currentless" plasma.

34275 (EUR—9618-Vol.1, pp 113-143) **NBI heating experiment of the heliotron E device.** Uo, K. 1985. NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803. (CONF-8409392—Vol.1).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

The target plasmas were produced by making use of the fundamental electron cyclotron resonance with two 200 kW/tube gyrotrons. The heating efficiency is expressed in the article. A detailed analysis of ion and electron energy balance has been done on this high-temperature plasma. The ion heating during NBI can be reasonably explained in terms of classical beam power deposition and the neoclassical thermal conduction. The major loss channel is caused by electron transport.

34276 (EUR—9618-Vol.1, pp 145-152) **ECH and ICRF experiments on heliotron E.** Motojima, O. 1985. NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803. (CONF-8409392—Vol.1).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

The microwave power (53.2 GHz, 320 kW) is transmitted through the low loss wave guide system to the Heliotron E

vacuum chamber and is radiated from the low field side with the double-coned beam of the dominant TE/sub 02/ mode. The processes of breakdown, build-up and heating of plasmas were investigated by changing the magnetic field strengh. The plasma can be produced both at fundamental and second harmonic resonances. An ICRF heating experiment with the aim of ion heating of a currentless ECRH plasma has been also performed. Results are presented and interpreted.

34277 (EUR—9618-Vol.1, pp 173-178) **ECRH in cleo stellarator.** Todd, T.N.; Takamura, S.; Hender, T. 1985. NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803. (CONF-8409392—Vol.1).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

ECRH has been applied to CLEO stellarator, using a low current ohmically heated target plasma with antin/sub e/ — 3 x 10/sup 12//cc. The high efficiency absorption of the X-mode at 2 ω/sub ce/ is seen to fall rapidly when n/sub e/ SPECIFICATIONS:Q2 Although at low RF power the plasma density falls slightly during the ECRH pulse, at high power it only falls for a few ms and then rises, quickly reaching the n/sub c/ value of 5 x 10/sup 12//cc at which loop voltage and diamagnetic evidence shows a loss of heating. Other results are presented and interpreted.

34278 (EUR—9618-Vol.1, pp 179-189) **Ion heating and orbit losses in Ni experiments on Wendelstein VII-A.** Junker, J. 1985. NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803. (CONF-8409392—Vol.1).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

The ion temperature of 1 keV as measured by energy analysis of cx neutrals has been confirmed by measurements of the Doppler broadening of the 0 VIII line both perpendicular and parallel to B, and the neutron flux from thermal D-D reactions. To fulfill the overall energy balance the necessary confinement of the fast particles has to be improved by a radial electric field which is built up by lost particles. Lost particles have been detected by the laser induced fluorescence of the sputtered Fe atoms. The stationary hydrogen spectrum has found to agree with the calculation assuming collisional slowing down of the injected particles. The measured neutron flux depends on the collisional slowing down time as expected. The transient response of the neutron flux and the cx particle flux at switching off the deuterium injector have been measured. Low harmonics of the ion cyclotron frequency have been observed by probe measurements.

34279 (EUR—9618-Vol.1, pp 191-201) **ECRH experiments in W VII A using different modes.** Erckmann, V. 1985. NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803. (CONF-8409392—Vol.1).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

In the W VII-A stellarator ECRH of OH-current-free plasmas at 28 GHz, 200 kW, 40 ms was investigated using the TE/sub 02/, TE/sub 01/, TE/sub 11/ and HE/sub 11/ modes as well as different wave-launching systems. The generation of the different modes in the transmitting waveguides is described. Discharges at optimum confinement conditions are compared. An increase of the central electron temperature is observed. Transport calculations show that this due to the narrowing of the power deposition profile. The heating efficiency can be explained by 0-mode single pass absorption only. The X-mode fraction does not contribute significantly to the global heating efficiency. For the TE/sub 11/ (HE/sub 11/)-case parametric decay of the X-mode pump wave near the UH-resonance layer occurs. Both decay wave spectra were measured and show a rapid drop near the lower hybrid frequency. Experiments with the ECR-layer off axis were performed.

34280 (EUR—9618-Vol.1, pp 205-217) **Confinement study of localized fast ions in heliotron E.** Uo, K. 1985. NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803. (CONF-8409392—Vol.1).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

In this presentation, we show the experimental verification of the numerically predicted containment of the localized-fast-ions orbit calculated by the Monte Carlo beam orbit Fokker-Planck code. Two beam lines, which have injection angles of perpendicular (BL-3) and 28/sup OMICRON/ (BL-1), are used for the experiment. The direction of BL-1 is that of the co-injection of the equivalent current of helical field. The drift orbit calculation shows that the fast ions created by BL-1 are deposited initially on passing orbits. However in the case of BL-3(perp.) injection, the fast ions are deposited on localized orbits.

34281 (EUR—9618-Vol.1, pp 219-231) **Energy and particle confinement in Wendelstein VII-A: Ni plasmas.** Jaenicke, R. 1985. NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803. (CONF-8409392—Vol.1).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

A first attempt to explain the heat transport in currentless neutral beam heated discharges was based on neoclassical ion heat conductivity chi/sub i/ for E/sub /r = 0 and collisional energy transfer between electrons and ions. The result was that the ions needed almost the total beam power transferred to the plasma in order to understand the measured high T/sub i/(r — > 0). However, further experiments showed that the postulated anomalous ion heating mechanism evidently does not exist since e.g. the measured ion slowing down times agree with the predictions from classical theory. Consequently the influence of radial electric fields E/sub r/ , which are derived from the poloidal rotation of impurity ions and which are due to the orbit losses of injected high energy ions, on the neoclassical chi/sub i/ has been checked . Using a calculated beam heating term the electron energy balance equation can be solved for the heat conduction term. Particle confinement improves as well during the transition from ohmic heating to neutral beam heated plasmas. A Monte Carlo code calculation following the trajectories of about 500 particles again shows the conderable improvement of the global confinement time tau/sub p/ with a radial potential difference.

34282 (EUR—9618-Vol.1, pp 233-243) **Energy and particle confinement in W VII-A: ECRH plasma.** Wilhelm, R.; Erckmann, V.; Janzen, G.; Kasparek, W.; Mueller, G.; Raeuchle, E.; Schueller, P.G.; Schwoerer, K.; Thumm, M. 1985. NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803. (CONF-8409392—Vol.1).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

In the ECRH experiments on W VII-A OH-current free stellarator plasmas were produced which are well in the LMFP regime. Plasma confinement at these conditions of low collisionality has been analyzed by modelling the measured temperature and density profiles by 1-D transport calculations.

34283 (EUR—9618-Vol.1, pp 247-258) **Impurity transport and plasma-wall interaction of the heliotron E plasma.** Motojima, O. 1985. NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803. (CONF-8409392—Vol.1).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

Impurities can play an important role in the production of reactor-grade plasmas, through radiation, enhanced resistivity and dilution of the working gas, possibly affecting the energy and particle transports of the plasma. It is therefore necessary to understand the origins and subsequent transport process of impurities in the plasma. While many experiments have been performed in tokamaks, few direct measurements of plasma-wall interaction and impurity transport have been done on helical systems. There is considerable speculation that impurities are important in the overall dynamics of the plasma of helical systems, especially during neutral beam heating experiments.

34284 (EUR—9618-Vol.1, pp 317-338) **MHD equilibrium and stability for stellarator configurations.** Carreras, B.A.; Cantrell, J.L.; Charlton, L.A.; Garcia, L.; Harris, J.H.; Hender, T.C.; Hicks, H.R.; Holmes, J.A.; Lynch, V.E. 1985. NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803. (CONF-8409392—Vol.1).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

The studies presented in this paper are focused on the improving the understanding of high β torsatrons, through the concept of flux control and the extension of the stellarator expansion to helical axis configurations.

34285 (EUR—9618-Vol.1, pp 339-356) **Mercier and resistive interchange instabilities in 3 D-code stellarator equilibria.** Nuehrenberg, J.; Zille, R. 1985. NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803. (CONF-8409392—Vol.1).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

Evaluation of Mercier's criterion in 3D flux-variable code equilibria yields insights into several critical aspects of stellarators. Since it requires calculation of the parallel current density, it can be used, for example, to verifiy the reduction of the current density in suitable configurations and to assess the singular pressure-driven current density near rational magnetic surfaces as well as its elimination by a flattened pressure profile or a finite separation Δiota in twist iota. With respect to the MHD stability itself evaluation of Mercier's criterion yields instability conditions of ideal and, suitably modified, resistive localized modes, both those resonant to the twist per period, which are always formally unstable or have to be eliminated by a flattened pressure profile, and those resonant to the total twist. Results are presented for W VII-AS, Heliac, ATF and some of its modifications, and l = 1, 2, 3 equilibria, in which the classical PS component of the parallel current density is eliminated.

34286 (EUR—9618-Vol.1, pp 357-362) **Equilibrium, stability and transport for Heliac.** Bauer, F.; Betancourt, O.; Garabedian, P. 1985. NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803. (CONF-8409392—Vol.1).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

The equilibrium, stability and transport code B has been released for general usage. Numerical results for both global and local stability compare favourably with recent data from the Helictron E. The code has been applied to arrive at a plausible set of specifications for a large Heliac experiment.

34287 (EUR—9618-Vol.1, pp 363-374) **Plasma behaviour at rational rotational transform in Wendelstein VII-A.** Wobig, H. 1985. NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803. (CONF-8409392—Vol.1).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

Plasma confinement in W VII-A is characterized by enhanced losses if the rotational transform at the plasma edge approaches a low order rational number (t(a) = 1/2, 1/3, 2/5, 2/3,...) t(a) is the sum of the external transform t/sub o/ and the transform of the plasma current. Small plasma currents introduce some shear, therefore confinement at t(a) = 1/2 is possible. Profile measurements comparing minima and maxima of confinement demonstrate enhanced losses mainly in energy confinement rather than in particle confinement. Three mechanisms responsible for these enhanced losses can be identified. 1) Islands in the vacuum field. Perturbations in the helix produce islands around t = 1/2, 1/3,... Figures 3 - and 4 exhibit this effect. 2) Island formation due to finite-β-effects. 3) Convective cells excited by external asymmetric sources.

34288 (EUR—9618-Vol.1, pp 377-386) **Convergence and extrapolation studies with the fit 3D code.** Schwenn, U. 1985. NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803. (CONF-8409392—Vol.1).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

The FIT Code, designed to compute ideal MHD equilibria, was tested on six configurations representative of stellarator research. The code was modified in the following points: 1) The previous iteration mehods were extended by a conjugate gradient method capable of varying all three dependent inverse variables r,z, and λ simultaneously. The non-uniqueness of these variables can be eliminated by appropriate coupling of some of the r- and z-coefficients in the Fourier series. The selected configurations are: 1) an axisymmetric Solov'ev equilibrium, where the energy was computed analytically; 2) an axisymmetric high-beta equilibrium, where, owing to the strong axis shift and the simple circular boundary λnot = O is necessary to obtain reasonable numerical solutions at all 3) a low aspect ratio (A — 4) l = 2 configuration, 4) an ATF model; 5) a W VII-AS; and 6) a Heliac. The results obtained with FIT are presented in detail and compared with those of other codes. The accuracy is checked by two scalars, the energy and the mean axis shift. Because of the radial (s) difference approximations, extrapolation in the mesh-size is necessary.

34289 (EUR—9618-Vol.2, pp 625-642) **Heating in W VII-AS.** Renner, H. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

The WENDELSTEIN VII-AS Stellarator will be constructed, to investigate the plasma behaviour during "currentless" operation in an optimized magnetic configuration. For the defined configuration an increase of the equilibrium limit to β = 4.5 % is predicted. By the particle drift optimization a reduction of transport losses by a factor of 1/2 in the intermediate regime compared to a conventional stellarator will be expected. Heating methods have to be provided, to explore the stability and equilibrium at high plasma pressure at low collisionality. In the transition to the long mean free path regime effects of trapped particles and modification of transport influenced by electric fields have to be studied.

34290 (EUR—9618-Vol.2, pp 427-436) **Bolometry in Wendelstein VII-A.** Kuehner, G. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

In the currentless phase of NB-heated discharges in W VII-A the radiation owing to accumulation of impurities (mainly oxygen) rises drastically towards the end of the discharge. Simultaneous bolometric measurements using a horizontal viewing position reveals broader radiation profiles as well as enhanced total radiation. The deviations begin in the currentless phase and increase in time.

34291 (EUR—9618-Vol.2, pp 449-462) **ECE measurements and power modulation in Wendelstein VII-A.** Hartfuss, H.J. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

A fast multichannel heterodyne radiometer system has been installed at W VII-A which enables the simultaneous measurement of electron temperature at 8 different radii of the plasma column. While good agreement is found with Thomson Scattering and SX temperature measurements during NBI heated plasma discharges, characteristic deviations are found in those heated by ECR.

34292 (EUR—9618-Vol.2, pp 463-472) **Computer evaluation of the magnetic field line Hamiltonian.** Kuo-Petravic, G.; Boozer, H. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

In this paper a canonical Hamiltonian method for measuring the widths of islands at resonant surfaces in a toroidal magnetic field is presented.

34293 (EUR—9618-Vol.2, pp 507-523) **Slowing down of neutral injected particles and heating efficiency in Wendelstein VII-A.** Maassberg, H. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

The excitation of ion cyclotron modes by the perpendicular neutral beam injection has been investigated by means of linear stability analysis. Strong instability was found for the switching on phase of the NI. The stationary slowing down distribution by Coulomb collisions, however, is expected to be mainly stable. The nonlinear Fokker-Planck equation for Coulomb interaction has been solved by Monte Carlo technique for Hdeg injection in a H/sup +//D/sup +/ plasma mixture. By means of Monte Carlo simulation, the ion confinement time is estimated as a function of the ambipolar potential. For the thermal ion component in the plateau regime, the transport properties are strongly reduced by the ambipolar electric field. Finally, the bounce averaged drift kinetic equation and the basic principles of the corresponding Monte Carlo simulation are discussed shortly.

34294 (EUR—9618-Vol.2, pp 563-581) **Configuration studies for TJ-II device.** Navarro, A.P. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

The construction of a device, TJ-II, to study plasma confinement by external magnetic fields, has been proposed at JEN, SPAIN. Here we present the motivation for the construction of such a device, its goals and constraints and the tentative schedule.

34295 (EUR—9618-Vol.2, pp 659-671) **Hamiltonian mechanics of magnetic fields.** Boozer, A.H. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

The Hamiltonian formulation is useful in the study magnetic surface quality, particle orbits, and ideal and resistive equilibrium and stability theory. Hamiltonian structure of divergence free fields is presented, then time evolution of such fields. Applications are given : surface quality, tearing modes, particle drift motion.

34296 (EUR—9618-Vol.2, pp 717-728) **Optimization of the magnetic design of Heliac.** Butcher-Ehrhardt, A. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

Helical axis stellarators are being examined as alternate concept devices because they have an inherent magnetic well, and, because of their large rotational transform, a potentially larger equilibrium beta limit due to a smaller toroidal shift. To avoid low order rational surfaces enclosed in the plasma, it is expected that it will be needed to have a small rotational transform per period, and thus many periods will be necessary. The optimization of the design of the vacuum magnetic field for Heliac has been facilitated by the development of the simulation program, Heliac. The current version has incorporated the calculation of the magnetic coordinates for the field (and other variables), allowing reconstruction of the magnetic surfaces, and estimates of the equilibrium beta limit from the worst component of 1/B/sup 2/, and from the formation of islands from resonant magnetic surfaces. The program is highly vectorized and can calculate a configuration of 10 magnetic surfaces in — 1 minute of CRAY time.

34297 (EUR—9618-Vol.2, pp 679-686) **Magnetic structure of toroidal stellarator near separatrix.** Danilkin, I.S. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

Structures of stellarators (torsatrons) magnetic configuration near separatrix which is the last closed magnetic surface bounding the nest of magnetic surfaces around elliptic ("vacuum") magnetic axis is analysed. To search "stagnation" (singular) points of the separatrix without tracing of the magnetic field line an analytical approach is developed.

34298 (EUR—9618-Vol.2, pp 401-416) **Dependence of rotational transform on beta in currentless stellarators. Comparison of stellarators expansion and 3D-code results.** Herrnegger, F. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

The variation of the rotational transform profile, of the specific volume, and of the radial axis displacement with β is investigated in currentless stellarators by using a magnetic field line tracing code (for the vacuum configurations), an asymptotic code, and the three-dimensional BBG/BETA codes. Four configurations are considered: $l = 2$ vacuum configurations with a large aspect ratio A and a magnetic well; $l = 2$ configurations with medium aspect ratio, large shear (as ATF-1), and magnetic well or hill; W VII-AS (wire):; Heliac-type configuration.

34299 (EUR—9618-Vol.2, pp 63-65) **Numerical linear stability analysis of anisotropic pressure stellarator plasmas.** Buckle, K.A.; Hitchon, W.N.G.; Shohet, J.L. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

The equations of state have been linearized and used in a numerical stability study, solving as an initial value problem. An approximate equilibrium was used, allowing for pressure anisotropy; an exact anisotropic equilibrium calculation (similar to Chodura-Schlueter calculation) would be preferable. It has been applied to Proto-CLEO/CLEO, JMS, WENDELSTEIN VII-A, HELIOTRON-E.

34300 (EUR—9618-Vol.2, pp 153-166) **Ohmic heating experiment on heliotron E.** Motojima, O. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

Results have been obtained with ohmic heating experiments and are presented. (1) The electron energy confinement is proportional to the inverse of the drift parameter. 2) A long confinement time is obtained in a small drift parameter range. The anomaly factors of electron and ion are less than 100 and 2 respectively. A high density plasma is obtained in a low current and small drift parameter range which is a good target plasma for NBI heating. 4) Disruption free and low q properties of the heliotron plasma are demonstrated.

34301 (EUR—9618-Vol.2, pp 167-172) **Currentless plasma production and heating by ECR in the L-2 stellarator. L-2 Team and ECRH Team.** Andryukhina, E. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

By using a gyrotron with 200 kW microwave power, $\lambda = 1$ cm a gaussian-like microwave beam is transmitted to the L-2 vessel. The waves of extraordinary polarisation are launched from the

strong field side with microwave power P/sub HF/=100 kW and puls duration up to 10 ms. Slow density growth rate is necessary for successful plasma heating. The heating has a resonance behaviour upon B/sub o/ and rather high efficiency P/sub absorbed//P/sub HF/ 30-50%.

34302 (EUR—9618-Vol.2, pp 66-74) **Bounce averaged Monte Carlo simulation of ripple transport in stellarators in presence of a strong radial electric field.** Hitchon, W.N.G.; Beidler, C.D.; Shohet, J.L. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

A computer code has been developed which simulates the transport of localized particles. Such particles are followed by advancing the poloidal angle, and iteratively conserving J, the bounce action, to solve for their radial motion. This is considerably faster than integrating an equation of motion for the particle.

34303 **(EUR—9618-Vol.2) Proceedings of the IAEA Technical committee meeting on plasma confinement and heating in stellarators.** Rau, F.; Leotta, G.G. (eds.). (Commission of the European Communities, Luxembourg). 1985. 380p. (CONF-8409392—Vol.2). NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804.

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

The second volume of these workshop proceedings gathers short contributions on experiments, theoretical articles on transport, on physics in mirror geometry, some papers on machines under construction or approved, and at last studies on configurations and reactors.

34304 (EUR—9618-Vol.2, pp 437-448) **Fluctuation measurements in Wendelstein VII-A.** Mueller, G. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

This is a report on measurements of coherent 2 mm microwave scattering on the W VII-A plasma under various stellarator operation conditions. Experimental results are presented on the following topics: - Frequency spectra and amplitudes of plasma fluctuations in typical stellarator operation phases as: - OH discharges, - quasi-currentfree, NB-heated plasmas, - transition region between OH - to quasi-currentfree plasmas, - Perpendicular component of k'-spectrum of plasma fluctuations in the currentfree, NB - sustained plasma state and - fluctuations close to and at rational rotation transform.

34305 (EUR—9618-Vol.2, pp 475-481) **Numerical balance of plasma heat transport in stellarators.** Dyabilin, K.S.; Kovrizhnykh, L.M. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

In the present paper an attempt is made of the consistent adequate comparison of the neoclassical heat transport model with experimental results. The comparative simple interpolation has been recently suggested which alows to obtain a sufficiently good description of the neoclassical transport in a whole variation region including the exact description in the early considered asymtotical cases. We use the suggested approach to compare the experimental and theoretical results in a wide variable regions and in those cases where such comparison would be most adequate.

34306 (EUR—9618-Vol.2, pp 493-505) **Monte Carlo simulation of neoclassical transport in stellarator vacuum fields.** Lotz, W. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

Neoclassical transport coefficients are computed by Monte Carlo simulation over a wide range of mean free paths in the approximation of small gyroradius, monoenergetic particle distribution, and vanishing electric field for simple axisymmetric and ripple tokamak model fields, and for many stellarator fields.

34307 (EUR—9618-Vol.2, pp 527-544) **Some aspects of transport in TMX-upgrade.** Baldwin, D.E. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

In the theory of equilibrium in an open system such as a tendem mirror, the condition of vanishing parallel current at the ends of the device is used to determine the surfaces of level pressure. The flux surfaces thus defined differ from those in a toroidal geometry in that parts of a surface are connected by particle drifts rather than flow along the magnetic field. The great difference in time scale for these two processes means that assumptions concerning rapid mixing within surfaces must be reexamined. Currently, the transport data from the TMX-U experiment is being examined with a view to whether effects of variation in the surfaces might be playing a role in the transport. To date, the conclusion is that the role of these effects on transport, if present, is not too important.

34308 (EUR—9618-Vol.2, pp 547-560) **L = +- 1 stellarator.** Kikuchi, T.; Shiina, S.; Saito, K.; Gesso, H.; Aizawa, M.; Kawakami, I. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

We report the magnetic field configuration of helical magnetic axis stellarator. The magnetic field configuration is composed of large l=1 field and small l=-1 and l=0(bumpy) fields. The large l=1 field (combined with the small l=-1 field) is used to form helical magnetic axis with the helical curvature much larger than the toroidal curvature, which provides the high limiting values of β. The small l=-1 field, furthermore, as well as the large l=1 field reduces the Pfirsch-Schlueter currents by combining with l=0 field. Therefore, the large l=1 field and the combination of three field components may be favourable for the increase of limiting β value.

34309 (EUR—9618-Vol.2, pp 483-492) **Radial electric field in a stellarator.** Shaing, K.C.; Fowler, R.H.; Hastings, D.E. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

In a stellarator, the particle fluxes are not intrinsically ambipolar and a radial electric field E/sub r/ develops to ensure quasineutrality. Such effects on stellarator transport have been studied in four areas (1) analytic expressions for particle and heat fluxes; (2) Monte Carlo simulations of transport scaling; (3) analytic understanding of the stability of an E/sub r/ value and the probability of transitions between allowed values for E/sub r/; (4) transport code simulations for an ATF-like device and Heliotron E.

34310 **(IAE—4252/14) Optical system with high relative aperture for investigation of radiation from a plasma in the infrared spectra.** Zhukovskij, V.G.; Zamkovets, A.D.; Rtishchev, V.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1986. 13p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702271.

Optical system with high relative aperture for measuring radiation from a plasma in infrared spectra is described. It is characteristics are investigated experimentally. Narrow-band cooled filters were developed for decreasing background noise of detectors. Pos-

sibility for using the optical system for diagnostics of Thompson scattering in the CO_2 laser is discussed. Measurement of infrared radiation from a plasma at the tokamak T-13 was attempted. Experiments show that the radiation from tokamak plasma will not impede measurement of CO_2 laser radiation scattered with a plasma. 6 references, 9 figures.

34311 **(IAE—4268/7) Relation of parameter profiles with plasma confinement in a tokamak.** Alikaev, V.V.; Vershkov, V.A.; Esipchuk, Yu.V.; Razumova, K.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1986. 24p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702272.

To investigate strongly differing discharge regimes at tokamaks with minor difference of the given parameters, a series of experiments at T-10 tokamak is conducted in the regimes with low currents. It is shown, that tokamak regimes can be subdivided into two types. In one of them, under more peaking parameter profiles, transfer coefficients approach neoclassical values, with the exception of those characterizing the electron balance. In the other, on the contrary, under minor diffusion and electron pinching rate coefficients, other transfer effects become strongly anomalous. Effect of auxiliary heating at C-resonance frequency on the transfer effects is considered. Assumptions, concerning the nature of the observed regularities are presented. 24 references, 15 figures, 3 tables.

34312 **(IAE—4277/6) Ion heat transfer theory in a tokamak plasma for a non-neoclassical distribution function.** Gott, Yu.V.; Yurchenko, Eh.I. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1986. 9p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702273.

Experiments on determination of ion heat conduction coefficient, carried out on a number of tokamaks, show that its value several times exceedes a value calculated using the neoclassical theory. Possible explanation of this difference is suggested in this work. It is shown that with consideration of finite banana width heat fluxes at the expense of considerable contribution to ion heat transfer with energy exceeding thermal energy increase several times as compared with neochlassical ones. Formula has been derived for calculation of ion heat transfer for any collision rates and any relations of Larmor ion radii and characteristic plasma dimensions. 9 references, 3 figures.

34313 **(IAE—4278/6) Nonlinear theory of the tearing mode.** Kutvitskij, V.A.; Yurchenko, Eh.I. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1986. 12p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702274.

Self-consistent nonlinear theory of magnetic island dynamics on development of tearing-instability is evolved. It is shown that accounting resonance magnetic surface motion related to evolution of equilibrium values results in effects of deceleration or acceleration of magnetic islands (depending on the direction of surface displacement). Theory perturbation method was used to obtain equation of small magnetic islands evolution. It follows from this equation that the presence of conductivity gradient on Joule heating always decelerates islands growth. 5 references.

34314 **(INIS-mf—10618) Particle density measurements in a nonsymmetrical plasma using holographic two-wavelength interferometry.** Blass, J. (Technische Univ. Muenchen (Germany, F.R.). Fakultaet fuer Elektrotechnik). 19 Jul 1984. 144p. (In German). NTIS (US Sales Only), PC A07/MF A01. File Number DE87751902.

A holographic/interferometric method is presented by which the particle densities of unsymmetric and unstationary plasmas can be measured. The plasma need not be reproducible if holographic two-wavelength interferometry is used for determining a reference value. A comparison with spectroscopic methods shows that holographic two-wavelength interferometry is a suitable method for establishing a reference value.

34315 (INIS-mf—10902, pp 14) **Suprathermal ions in fusion plasmas.** Heindler, M.; Heinrichs, G.; Kernbichler, W.; Nassri, A. Dec 1986. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702298.

In Annual report (October 1985 - September 1986).

34316 (INIS-mf—10902, pp 14-15) **Cyclotron radiation in plasmas.** Heindler, M.; Heinrichs, G.; Kernbichler, W.; Nassri, A. Dec 1986. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702298.

In Annual report (October 1985 - September 1986).

34317 **(IPP—4/230) Role of plasma equilibrium current in Alfven wave antenna optimization.** Puri, S. (Max-Planck-Institut fuer Plasmaphysik, Garching (Germany, F.R.)). Dec 1986. 44p. NTIS (US Sales Only), PC A03/MF A01. File Number DE87751916.

The modifications in the antenna loading produced by the plasma equilibrium current, the Faraday shield, and the finite electron temperature for coupling to the Alfven waves are studied using a self-consistent, three-dimensional, fully analytic periodic-loop-antenna model. The only significant changes are found to occur due to the plasma current and consist of an improved coupling (by a factor of proportional to 2.5) at low toroidal numbers (n proportional to 1-3). Despite this gain, however, the coupling to low n continues to be poor with $R=0.03\ \Omega$ and $Q=180$ for $n=2$. Optimum coupling with $R=0.71\ \Omega$ and $Q=16.8$ occurs for $n=8$ as was also the case in the absence of the plasma current. For the large n values, mode splitting due to the removal of the poloidal degeneracy combined with the finite electron temperatures effects lead to significant broadening of the energy absorption profile. Direct antenna coupling to the surface shear wave is small and no special provision, such as Faraday shielding, may be needed for preventing surface losses. The introduction of the Faraday screen, in fact, increases the coupling to the surface shear wave, possibly by acting as an impedance matching transformer between the antenna and the plasma. The finite electron temperature causes the predictable increase in the absorption width without influencing the antenna coupling. Thus the recommendations for antenna design for optimum coupling to the Alfven wave remain unaffected by the inclusion of the plasma current. Efficient coupling with capabilities for dynamic impedance tracking through purely electronic means may be obtained using a dense-cluster-array antenna with a toroidal configuration of n proportional to 8.

34318 **(IPP—III/118) Density measurements in the boundary layer of the ASDEX RF heated plasma.** El Shaer, M. (Max-Planck-Institut fuer Plasmaphysik, Garching (Germany, F.R.)). Nov 1986. 24p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87751915.

The boundary layer in the main chamber of ASDEX is diagnosed using a movable 2.2 mm microwave interferometer. The measured radial density profile decreases exponentially outside of the separatrix with three different e-folding lengths, the middle part of the profile is flatter with a larger e-folding length. The boundary density increases proportionally to the increase of the main plasmy density near the separatrix, far from the separatrix this increase is weaker. The boundary density increases with the increase of the main magnetic field in the discharge. With the application of the RF heating at the lower hybrid frequency the boundary density is submitted to a large modification. The behavior of this modification in the density profile depends on the rate of injection of the cold feeding gas. In the discharge with a constant or decreasing gas feeding rate the density profile flattens, and with an increasing rate it steepens when the RF pulse is applied.

34319 **(IPPCZ—254) Joint Czechoslovak-Soviet workshop on current drive in tokamaks.** (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Oct 1985. 72p. (In English and Russian). (CONF-8505352—). NTIS (US Sales Only), PC A04/MF A01. File Number DE87702303.

From Joint Czechoslovak-Soviet workshop on current drive in tokamaks; Liblice, Czechoslovakia (15 May 1985).

At the Joint Czechoslovak-Soviet Workshop on Current Drive in Tokamaks, five papers dealing with issues of general inter-

est were presented. In a theoretical paper by Klima and Pavlo a one-dimensional model of the lower-hybrid current drive is described and the results of its analysis are used in a numerical simulation using T-7 tokamak parameters. In the second theoretical paper by Vojtsekhovich, Parail and Pereverzev the influence of the LH wave spectrum on the efficiency of the current drive is studied. Two papers deal with a new microwave system designed for experiments on LHCD in the T-7 tokamak. In particular, the power spectra of new four-waveguide grills are computed. In the last paper the non-inductive start-up of the discharge in the T-7 tokamak by means of electron cyclotron waves is investigated. (J.U.).

34320 (IPPCZ—254, pp 3-29) **Computer simulation of lower hybrid current drive.** Pavlo, P.; Klima, R. Oct 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE87702303. (CONF-8505352—).

From Joint Czechoslovak-Soviet workshop on current drive in tokamaks; Liblice, Czechoslovakia (15 May 1985).

A physical model is presented based on the 1-D Fokker-Planck equation and including the runaway effect for lower hybrid current drive. The numerical procedure is shown allowing to solve the kinetic equation for an arbitrary shape of the spectrum (with the inclusion of the parasitic wing) and a strong electric field. The effect of the electric field on the driven current is investigated. The results demonstrate strong dependence of the driven current magnitude on power contained in the short wavelength (SW) part of the spectrum. The shape of the SW part strongly influences the driven current radial profile. The possible role of nonlinear generation of third harmonic waves due to the ponderomotive density modulation at the plasma edge is discussed. All numerical results were obtained for T-7 tokamak parameters.

34321 (IPPCZ—254, pp 38-50) **Influence of resonance particle escape on the lower-hybrid current drive.** Vojtsekhovich, I.A.; Parail, V.V.; Pereverzev, G.V. Oct 1985. (In Russian). NTIS (US Sales Only), PC A04/MF A01. File Number DE87702303. (CONF-8505352—).

From Joint Czechoslovak-Soviet workshop on current drive in tokamaks; Liblice, Czechoslovakia (15 May 1985).

The dependence of current-drive efficiency on the shape of lower-hybrid wave spectra is investigated theoretically. The interaction of plasma electrons with lower-hybrid waves is described by a set of quasilinear equations. Its solution is used for estimating the driven current. The optimum wave spectrum for an efficient current drive is found. As shown, at non-optimum spectra current-drive efficiency is substantially reduced by a significant loss of fast particles. The current-drive efficiencies are calculated for various plasma and incident wave parameters used in several actual experiments. The mechanism described in the paper might explain the existing disagreement between the theoretical predictions and the results of most present experiments. (J.U.).

34322 (IPPCZ—254, pp 65-71) **Preliminry remarks on the project of HF system for non-inductive current-drive experiments in T-7 facility.** Datlov, J.; Kopecky, V.; Kislov, A.Ya. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu; Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). Oct 1985. (In Russian). NTIS (US Sales Only), PC A04/MF A01. File Number DE87702303. (CONF-8505352—).

From Joint Czechoslovak-Soviet workshop on current drive in tokamaks; Liblice, Czechoslovakia (15 May 1985).

For future experiments on lower-hybrid current drive and plasma heating experiments in the T-7 tokamak in Moscow it is necessary to develop a powerful high-frequency system operating at higher frequencies. Such a system with an operating frequency of 2.45 Gcps is being designed in cooperation with the Czechoslovak Institute of Plasma Physics. The basic requirements which had to be taken into account in its construction are recapitulated in the paper. The main parts of the high-frequency system consisting of a three-stage multichannel klystron generator, transmitting waveguides, and a tandem grill are discussed in detail. Attention is paid to the vacuum part of the grill. The main issues still to be solved are brifefly mentioned. (J.U.).

34323 (IPPCZ—254, pp 51-64) **Non-inductive start-up of the T-7 tokamak discharge.** Alikaev, V.V.; Borshchegovskij, A.A.; Verin, A.E.; Vojtsekhovich, I.A.; Volkov, V.V.; Ivanov, D.P.; Ivanov, N.V.; Il'in, V.I.; Kakurin, A.M.; Kislov, A.Ya. Oct 1985. (In Russian). NTIS (US Sales Only), PC A04/MF A01. File Number DE87702303. (CONF-8505352—).

From Joint Czechoslovak-Soviet workshop on current drive in tokamaks; Liblice, Czechoslovakia (15 May 1985).

The behaviour of a plasma ring in a tokamak in the stage of gas ionization by electron cyclotron waves is studied both theoretically and experimentally. For the toroidal current to arise, the plasma ring balance condition must be fulfilled, e.g., due to the presence of a small vertical component of magnetic field connected with an outward plasma motion. The results of calculations based on such a model agree qualitatively very well with the experimental data obtained until now. Ring currents high enough for obtaining rotational transform were produced in the T-7 tokamak using electron cyclotron waves. The possibility of further current enhancement by introducing lower hybrid waves was also demonstrated. (J.U.).

34324 (IPPCZ—257) **On the influence of α-particle cyclotron damping on the lower hybrid current drive.** Krlin, L.; Pavlo, P.; Tluchor, Z. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Nov 1985. 4p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702304.

Preliminary results are reported of investigating the effect of the cyclotron harmonic damping of lower hybrid waves by alpha particles produced in thermonuclear reactions. The quasilinear change of the slope of the alpha particle distribution function is considered. The presented analytical estimates show that the power absorbed by alpha particles can reach a saturation level, provided that the wave energy density is sufficiently high. For the parameters of a hypothetical hybrid reactor, the saturated power was found to be much lower than that computed in the linear theory. Thus, the alpha particles need not represent a serious obstacle to the lower hybrid current drive in hybrid reactors. Some further aspects of the effect in question are discussed. (J.U.).

34325 (IPPCZ—258) **Modulation instability and strong Langmuir turbulence of supersonic plasma waves-computer simulations.** Sedlacek, Z.; Jungwirth, K.; Stavinoha, P. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Nov 1985. 15p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702305.

A one-dimensional computer simulation of the free-evolving turbulence of Langmuir waves with an initial Gaussian spectral distribution and random phases of Fourier harmonics is reported. The discrete Fourier transformation was applied to the Zakharov set of equations. The resulting equations for the time evolution of up to 512 Fourier harmonics of electric field and ion density perturbations were solved by the Runge-Kutta method. The time dependence of energy density of plasmons and excited ion sound waves, as well as the spatial profiles of plasmon energy and ion density and electric field and density spectra in each time step were calculated. In all the runs performed, modulation processes were dominant. About 60 percent of plasmons become trapped in density wells while simultaneously ion sound waves were excited. Nonlinear formations such as quasi-solitons and cavitons are well seen in the plots of temporal evolution of the density and plasmon energy perturbations. (J.U.).

34326 (IPPCZ—259) **Computer simulation of lower hybrid current drive in T-7 tokamak.** Pavlo, P.; Klima, R. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Sep 1985. 4p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702306.

Some of the results obtained in computer simulations of the lower hybrid current drive (LHCD) in the T-7 tokamak are presented. Reasonable agreement between computed and observed values of the driven current is even found for unmodified linear spectrum of the T-7 grill. This is attributed to the presence of a weak short wavelength (SW) part of the spectrum. The role of this weak SW part as a bridge between rather cold electrons and high

phase velocity LH waves is discussed. The conception of the SW bridge is applied to the problem of the density limit.

34327 **(IPPCZ—262) Power dependence of the reflection coefficient at lower hybrid heating.** Petrzilka, V.A.; Klima, R.; Pavlo, P. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Jan 1986. 16p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702307.

In lower hybrid plasma heating and current-drive experiments in tokamaks, the high-frequency waves are usually launched at the plasma edge by a waveguide structure (a grill). The possibility to minimize the power reflection coefficient of the grill by varying the unperturbed edge plasma density is studied. Due to the ponderomotive action of the HF field at the plasma edge, the power reflection coefficient can vary considerably with increasing HF power. Lower values of k/sub z/ and higher values of the plasma density suppress the ponderomotive effect. With a fixed density profile given by experimental conditions, an optimum plasma edge density can be found by shifting the grill in the radial direction. The optimum grill position depends on the HF power launched. The values of parameters used in numerical computations are related to experiments in the T-7 tokamak. (J.U.).

34328 **(IPPCZ—263) Possible role of the bootstrap effect in the RF current drive experiments. Part II.** Klima, R.; Petrzilka, V.A. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Dec 1985. 27p. NTIS (US Sales Only), PC A03/MF A01. File Number DE87702308.

For part I see Czech. J. Phys. (1985) v. 35(5) p. 512-517.

The conditions for the existence of the bootstrap effect at anomalous diffusion in tokamaks are discussed. Assuming that these conditions are fulfilled at lower-hybrid current drive, various models of anomalous diffusion and of temperature profiles are considered. Toroidal current density profiles and related quantities are calculated, demonstrating strong dependence on electron temperature profiles and on the effective ion charge Z/sub eff/. Recommendations for showing the bootstrap current by experiment are presented.

34329 **(IPPCZ—268) Initial-value problem for the 1-D wave equation in an inhomogeneous medium.** Sedlacek, Z.; Roberts, B.; Adam, J.A. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Mar 1986. 55p. NTIS (US Sales Only), PC A04/MF A01. File Number DE87702309.

A complete mathematical analysis of oscillations of an inhomogeneous medium described by a wave equation with a space-dependent coefficient is given. The initial-value problem is solved both by the Laplace transform and by normal-mode analysis and the equivalency of both approaches is demonstrated. The Green function of the problem is a double-valued function of the complex frequency, analytic in the upper and lower halves of the complex frequency plane (the physical sheet of its Riemann surface) with discontinuity on the whole real axis, corresponding to the continuous frequency spectrum of the physical system in question. The Green function has complex poles on analytic continuation onto the unphysical sheet of its Riemann surface. This makes it possible, by inverting the Laplace transform, to interpret the solution of the initial-value problem in terms of damped eigenmodes. The continuum eigenmodes can be constructed directly and are also recovered by integrating the Green function in the complex frequency plane along a closed contour enclosing the spectrum. Their orthogonality and completeness is proved. The solution of the initial-value problem synthesized from the continuum eigenmodes can be interpreted in terms of travelling disturbances scattered by inhomogeneity.

34330 **(ITEF—108(1986)) Possibilities of high-temperature fusion plasma production.** Okorokov, V.V.; Chuvilo, I.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). 1986. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702317.

A method of high-temperature fusion plasma production using colliding intense bunches of deuteron (or tritium) clusters inside rectilinear space of one of the known systems of plasma magnetic confinement (tokamak, stellarator, magnetic mirror) is suggested. A great number (10^3-10^4) of deuterium atoms per charge unit in clusters permits to bring the mass of accelerated substance in the cluster bunches to the values at which mutual slow-down of all deuterons, in the clusters, becomes possible. In this case all longitudinal kinetic energy of cluster bunches transforms into the energy of chaotic thermal motion of deuterium (tritium) nuclei in plasma formed inside the trap during cluster bunch collisions. The flowsheet of the installation, which can realize the suggested method of fusion plasma production, is presented. Colliding cluster bunches are formed in two storage rings, to which accelerated clusters are injected. Positivey charged cluster ions of hydrogen heavy isotopes D/sub $(2n+1)^+$ (or T/sub $(2n+1)^+$) are formed in cluster sources, then they pass to the accelrator inlet. 8 references.

34331 **(ITEF—110(1986)) Formulation of the problem of the cylindrical Z-pinch with consideration of the terms connected with a thermal force.** Gerusov, A.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). 1986. 17p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702318.

The problem of structure of cylindrical Z-pinch at the stage of convergence is solved taking into account terms related to the thermal force. The terms have not been considered in MHD description of the discharge before. It is shown that at high magnetization of electron terms related to the thermal force are of one order with terms, providing a considerable contribution to the distribution of physical values in the plasma pinch envelope. Evolution condition of the system of equations describing the discharge, taking into account new terms, is obtained. Stability conditions of difference equations for solution of the system of equations describing the dynamics of Z-pinch with new terms are also obtained. 11 references.

34332 (JINR—D-13-85-793, pp 228-232) **New CAMAC developments for nuclear spectroscopy in the Central Research Institute for Physics.** Nagy, J.Z.; Zarandy, A. 1985. NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

Several CAMAC modules developed for tokamak instrumentation are considered. The CAM 4.04-3 8-Channel Pulse Peak Analyzer is a three unit wide CAMAC module designed for plasma diagnostics. The module contains 8 independent 256-channel fast amplitude analyzers. It has a memory of 32 K words with a word length of 16 bits. The CAM 4.33-1 Phase Meter is intended for experiments to measure the refraction index of tokamak plasma. The measurements are performed by two laser beams one of which crosses the plasma. The phase difference between the two signals obtained on photodiodes carrying indormation on the refraction index is measured by the Phase Meter under consideration. The CAM 4.31-11 8-Channel Waveform Digitizer is used to analyse relatively fast varying dc signals. It is actually an 8-channel transient recorder. The CAM 2.20-3 Analyzer Memory is a double width CAMAC module containing 16K words with a word length of 24 bits.

34333 (JINR—D-13-85-793, pp 408-412) **Technique for measuring hot plasma electron temperature by soft X-ray spectra with increased resolution.** Gulyaev, V.A.; Kabanovskij, S.V.; Lyadina, E.S. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

Ways of improving time resolution of amplitude spectrometers used for diagnostics of hot plasma in tokamaks are discussed. The circuit of an analog-to-digital processor for processing signals coming from detectors is suggested. The converter comprises 8 similar channels each of them including an input shaper, differential discriminator with a wide energy band; fast shaper with shaping time of 0.1-0.2 μs, analog delay circuit, linear transmission circuit, control device, slow shaping circuit, differential discriminator with

a narrow energy band, digital intensimeter. Model test of the described channel is conducted; it confirmed correctness of the applied method.

34334 **(KIYI—86-23) Two-stage beam-plasma system instabilities.** Pavlov, S.N.; Khmaruk, V.G. (AN Ukrainskoj SSR, Kiev. Inst. Yadernykh Issledovanij). 1986. 16p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702388.

Both high-frequency and low-frequency instabilities in two-stage beam-plasma system are investigated. Five types of oscillations of plasma are found to be excited in such system. They are high-frequency low-hybrid, ion-cyclotron, drift, ion-acoustic and relaxation oscillations. Two regimes of low-hybrid oscillation excitation are found. The spatial location of the region, where the maximum high-frequency field generation occurs, and beam relaxation degree are different for these regimes. The phenomenological picture of electron heating is given. The effect of ion-cyclotron instability on distribution of steady-state potential in plasma is determined. It leads to formation of potential well for ions in the second stage near the system axis. 7 references, 19 figures.

34335 (N—87-20055, pp vp) **Technical issues in the conduct of large space platform experiments in plasma physics and geoplasma sciences.** Szuszczewicz, E.P. Oct 1986. NTIS, PC A20/MF A01. (NASA-CR—180231; JPL-PUB—86-49; NAS—1.26:180231; CONF-8609284—).

From Workshop on space technology plasma issues in 2001; Pasadena, CA, USA (24 Sep 1986).

Large, permanently-manned space platforms can provide exciting opportunities for discoveries in basic plasma and geoplasma sciences. The potential for these discoveries will depend very critically on the properties of the platform, its subsystems, and their abilities to fulfill a spectrum of scientific requirements. With this in mind, the planning of space station research initiatives and the development of attendant platform engineering should allow for the identification of critical science and technology issues that must be clarified far in advance of space station program implementation. An attempt is made to contribute to that process, with a perspective that looks to the development of the space station as a permanently-manned Spaceborne Ionospheric Weather Station. The development of this concept requires a synergism of science and technology which leads to several critical design issues. To explore the identification of these issues, the development of the concept of an Ionospheric Weather Station will necessarily touch upon a number of diverse areas. These areas are discussed.

34336 (N—87-20055, pp vp) **Review of the findings of the plasma diagnostic package and associated laboratory experiments: Implications of large body/plasma interactions for future space technology.** Murphy, G.B.; Lonngren, K.E. Oct 1986. NTIS, PC A20/MF A01. (NASA-CR—180231; JPL-PUB—86-49; NAS—1.26:180231; CONF-8609284—).

From Workshop on space technology plasma issues in 2001; Pasadena, CA, USA (24 Sep 1986).

The discoveries and experiments of the Plasma Diagnostic Package (PDP) on the OSS 1 and Spacelab 2 missions are reviewed, these results are compared with those of other space and laboratory experiments, and the implications for the understanding of large body interactions in a low Earth orbit (LEO) plasma environment are discussed. First a brief review of the PDP investigation, its instrumentation and experiments is presented. Next a summary of PDP results along with a comparison of those results with similar space or laboratory experiments is given. Last of all the implications of these results in terms of understanding fundamental physical processes that take place with large bodies in LEO is discussed and experiments to deal with these vital questions are suggested.

34337 (N—87-20055, pp vp) **Laboratory plasma interactions experiments: results and implications to future space systems.** Leung, P. Oct 1986. NTIS, PC A20/MF A01. (NASA-CR—180231; JPL-PUB—86-49; NAS—1.26:180231; CONF-8609284—).

From Workshop on space technology plasma issues in 2001; Pasadena, CA, USA (24 Sep 1986).

The experimental results discussed show the significance of the effects caused by spacecraft plasma interactions, in particular the generation of electromagnetic interference. As the experimental results show, the magnitude of the adverse effects induced by plasma interactions (PI) will be more significant for spacecraft of the next century. Therefore, research is needed to control possible adverse effects. Several techniques to control the selected PI effects are discussed. Tests, in the form of flight experiments, are needed to validate these proposed ideas.

34338 (N—87-20055, pp vp) **Plasma generator utilizing the high intensity ASTROMAG magnets.** Sullivan, J.D.; Post, R.S.; Lane, B.G.; Tarrh, J.M. Oct 1986. NTIS, PC A20/MF A01. (NASA-CR—180231; JPL-PUB—86-49; NAS—1.26:180231; CONF-8609284—).

From Workshop on space technology plasma issues in 2001; Pasadena, CA, USA (24 Sep 1986).

The magnet configuration for the proposed particle astrophysics magnet facility (ASTROMAG) on the space station includes a cusp magnetic field with an intensity of a few tesla. With these large magnets (or others) located in the outer ionosphere, many quite interesting and unique plasma physics experiments become possible. First there are studies utilizing the magnet alone to examine the supersonic, sub-Alfvenic interaction with the ambient medium; the scale length for the magnet perturbation is approx. 20 m. The magnetic field geometry when combined with the Earth's and their relative motion will give rise to a host of plasma phenomena: ring nulls, x-points, ion-acoustic and lower-hybrid shocks, electron heating (possible shuttle glow without a surface) launching of Alfven waves, etc. Second, active experiments are possible for a controlled study of fundamental plasma phenomena. A controlled variable species plasma can be made by using an RF ion source; use of two soft iron rings placed about the line cusp would give an adequate resonance zone (ECH or ICH) and a confining volume suitable for gas efficiency. The emanating plasma can be used to study free expansion of plasma along and across field lines (polar wind), plasma flows around the space platform, turbulent mixing in the wake region, long wavelength spectrum of convecting modes, plasma-dust interactions, etc.

34339 **(ORNL/TM—10224) Global ion cyclotron waves in a perpendicularly stratified, one-dimensional warm plasma.** Jaeger, E.F.; Batchelor, D.B.; Weitzner, H. (Oak Ridge National Lab., TN (USA)). Apr 1987. Contract AC05-84OR21400. 52p. NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87010145.

The sixth-order wave equation which results from a finite temperature expansion of the Vlasov equation is solved globally in a perpendicularly stratified, one-dimensional slab plasma. The diamagnetic drift and associated anisotropy are included in the unperturbed distribution function to ensure a self-adjoint system. All x-dependence in the plasma pressure and magnetic field is retained along with the electric field parallel to vector B. Thus, Landau damping of the ion Bernstein wave is included as well. Because the wave equation is solved implicitly as a two-point boundary value problem, the evanescent short-wavelength Bernstein waves do not grow exponentially as in shooting methods. Solutions to the complete sixth-order partial differential equation are compared to those from an approximate second-order equation based on local dispersion theory. Strong variations occur in the absorption and in the structure of the wave fields as resonance topology is varied.

34340 **(ORNL/TM—10412) Some practical considerations involving spectral representations of 3-D plasma equilibria.** Attenberger, S.E.; Houlberg, W.A.; Hirshman, S.P. (Oak Ridge National Lab., TN (USA)). Apr 1987. Contract AC05-84OR21400. 27p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87010148.

For describing magnetically confined toroidal plasmas, it is convenient in some instances to use a cylindrical coordinate system whose origin is on the major axis of the torus and in others to use a "flux coordinate" system bound to the magnetic flux which is embedded in the plasma. A good estimate of the flux surface geometry is available in spectral form in many cases, permitting a simple transformation from flux coordinates to cylindrical coordinates. A modified Newton iteration is described for performing the "in-

verse" transformation from cylindrical coordinates to flux coordinates. An accurate technique for radial spline interpolation of the spectral coefficients is given which is particularly useful for computing magnetic fields near the magnetic axis. Given a spectral representation of the plasma, it is possible to track a chord through the plasma, determining in sequence its intersections with a given set of flux surfaces. This technique is the starting point for many calculations, including neutral beam heating, pellet fueling, evaluation of absorption or plasma sources along the lines-of-sight of detectors, etc. An efficient algorithm for performing this calculation is given.

34341 **(UCRL—94435) Drift pumping of tandem mirror thermal barriers.** Baldwin, D.E.; Byers, J.A.; Chen, Y.J.; Kaiser, T.B. (Lawrence Livermore National Lab., CA (USA)). 24 Sep 1986. Contract W-7405-ENG-48. 13p. (CONF-861106—26). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009562.

From IAEA international conference on plasma physics and controlled nuclear fusion research; Kyoto, Japan (12 Nov 1986).

Drift pumping is a means of selectively removing low-energy ions from the thermal barrier of a tandem mirror by induced radial transport. This paper determines the conditions for, and properties of, transport induced by externally applied low-frequency waves resonating with the trapped-ion azimuthal drift frequency. Considerations that are discussed include conditions necessary for stochasticity, derivation of the local diffusion coefficient, and computation of the perturbed fields throughout the plasma for a model based on TMX-U profiles with and without a throttle-coil geometry.

34342 **(UCRL—96562) ECH [electron cyclotron heating] in the Microwave Tokamak Experiment.** Stallard, B.W.; Smith, G.R.; James, R.A.; Thomassen, K.I.; Kritz, A.H.; Makowski, M.; Samec, T.; Yamamoto, R. (Lawrence Livermore National Lab., CA (USA); Hunter Coll., New York (USA); TRW, Inc., Redondo Beach, CA (USA)). 28 Apr 1987. Contract W-7405-ENG-48. 5p. (CONF-870570—3). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009580.

From 7. topical conference on applications of radio-frequency power to plasmas; Kissimmee, FL, USA (4 May 1987).

The Microwave Tokamak Experiment (MTX) at LLNL will investigate electron heating in the MTX tokamak (formerly Alcator-C) at high density (up to 6 x 10^{20} m^{-3}) and high power by using a free electron laser (FEL). Parameters of the FEL are a peak power up to 8 GW and 50 ns duration, with average power 1 to 2 MW, at a frequency of 250 GHz. The planned input driver for the FEL is a gyrotron oscillator. The FEL output will be transported quasi-optically, inside a 50 cm evacuated pipe, to the input port of the tokamak by means of a four-mirror system. Launch polarization is the ordinary mode. This experiment will test the FEL technology at short wavelength and high peak and average power levels. Important physics issues to be explored are the effects of intense pulse heating (electric field up to 500 kV/cm) on nonlinear wave absorption and bulk heating, plasma confinement, plasma impurities, and parametric instabilities. Because the FEL technology is scalable to higher frequency and power, success of these experiments has importance for next-generation tokamaks.

34343 **Accelerator laser self-trapping for the plasma fiber.** Barnes, D.C.; Kurki-Suonio, T.; Tajima, T. (Science Applications International Corp., Austin, TX 78746). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Plasma Science;* **PS-15**: No. 2, 154-160(Apr 1987).

A short-pulsed intense laser is injected into an underdense plasma to sustain a self-trapped photon channel. With either high-enough intensity or strong-enough focusing the optical beam causes total electron evacuation on the beam axis. Under appropriate conditions this laser and plasma fiber system can provide a slow wave structure of the electromagnetic wave that is suitable for high-energy acceleration.

34344 **Plasma focusing for high-energy beams.** Chen, P.; Su, J.J.; Katsouleas, T.; Wilks, S.; Dawson, J.M. (Stanford Linear Accelerator Center, Stanford Univ., Stanford, CA 94305). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Plasma Science;* **PS-15**: No. 2, 218-225(Apr 1987). Contract AC03-76SF00515.

The authors analyze the self-focusing effect of a relativistic electron or positron beam transversing through a thin slab of plasma in a linearized fluid theory, and show that the effect is very strong. The idea of employing this effect for a plasma lens suggested by Chen is then reviewed. The self-focusing force can be made uniform over the length of the beam by injecting an appropriate precursor. Computer simulations on both thin and thick plasma lenses are presented, which show reasonable agreement with theoretical predictions.

34345 **On beat wave excitation of relativistic plasma waves.** Mori, W.B. (Electrical Engineering and Physics Departments, Univ. of California at Los Angeles, Los Angeles, CA 90024). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Plasma Science;* **PS-15**: No. 2, 88-106(Apr 1987).

The beat wave excitation process is examined analytically in the Eulerian field description. The effects of plasma drifts, harmonics, pump rise time, frequency mismatch, phenomenological damping, plasma inhomogeneities, and two dimensions are discussed. The consistency between the Eulerian and Lagrangian fluid descriptions is verified.

34346 **Electrostatic mode coupling of beat-excited electron plasma waves.** Darrow, C.; Mori, W.B.; Katsouleas, T.; Joshi, C.; Umstadter, D.; Clayton, C.E. (Lawrence Livermore National Lab., Livermore, CA 94550). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Plasma Science;* **PS-15**: No. 2, 107-130(Apr 1987). Contract AC02-83ER40121.

The process of beat excitation of electron plasma waves in a plasma containing a density ripple is studied theoretically, experimentally, and computationally. A single theoretical model has been developed which, for modest experimental parameters, predicts a new beat wave saturation mechanism. This mechanism involves the excitation of a spectrum of secondary electrostatic modes which divert pump energy from the beat wave and can lead to saturation of the beat wave at an amplitude well below that expected for relativistic detuning. Experiments designed to study the coupled mode spectrum were performed. The measured properties of the electrostatic spectrum are in reasonable agreement with the theory. To bridge the gap between the idealized model and the experiment, computer simulations were performed for a variety of parameters.

34347 **Temporal energy cascading in the beat wave accelerator.** Batha, S.H.; McKinstrie, C.J. (Lab. for Laser Energetics and Dept. of Mechanical Engineering, Univ. of Rochester, Rochester, NY 14627). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Plasma Science;* **PS-15**: No. 2, 131-133(Apr 1987).

A preliminary analytic study of the temporal evolution of the beat wave accelerator (BWA) has been conducted. It was found that while energy cascading is crucial to the interpretation of current simulations, it will be less important in an actual device where the existing simple fluid model will be adequate.

34348 **Relativistic self-focusing of short-pulse radiation beams in plasmas.** Sprangle, P.; Tang, C.M.; Esarey, E. (Plasma Theory Branch, Plasma Physics Div., Naval Research Lab., Washington, DC 20375). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Plasma Science;* **PS-15**: No. 2, 145-153(Apr 1987).

An envelope equation is derived which describes the radial evolution of a radiation beam propagating through a plasma. The radiation envelope equation contains a defocusing term due to the diffraction spreading and a focusing term due to relativistic oscillations of the plasma electrons. The case of a constant density background plasma is analyzed in detail and an expression for a critical laser power is derived. For powers exceeding the critical power,

the radiation envelope oscillates and does not diffract. Under certain conditions the radiation beam propagates through the plasma with a constant radius envelope.

34349 **Nonlinear plasma dynamics in the plasma wakefield accelerator.** Rosenzweig, J. (Dept. of Physics, Univ. of Wisconsin-Madison, Madison, WI 53706). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Plasma Science;* **PS-15**: No. 2, 186-191(Apr 1987).

Excitation of nonlinear plasma oscillations by an ultra-relativistic electron beam is considered in this paper. It is shown, by analytical solutions of the fully relativistic nonlinear fluid equations in one dimension, that under certain conditions on the relative densities of the electron beam and the plasma, extremely large longitudinal electric fields can be generated in the wake of the beam. This scheme can be considered as a nonlinear regime of the plasma wakefield accelerator (PWFA), and is seen to have the advantage that the transformer ratio, the ratio of the maximum amplitude of the accelerating field behind the driving beam over the maximum amplitude of the decelerating field inside of the beam, can be made arbitrarily large, dependent only on the length of the driving beam.

34350 **Simulation of the Wisconsin-Argonne plasma wakefield experiment.** Keinigs, R.; Jones, M.E.; Su, J.J. (Los Alamos National Lab., Los Alamos, NM 87545). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Plasma Science;* **PS-15**: No. 2, 199-202(Apr 1987).

The plasma wafefield accelerator (PWFA) is an advanced accelerator concept that uses the large electric fields that can be generated in a plasma to accelerate charged particles. The authors present the results of a self-consistent two-dimensional simulation of the first experiment designed to test this concept. Linear theory predicts for this experiment an accelerating gradient of approximately 95 MV/m. However, the simulations indicate that a much larger accelerating field is achieved in the plasma.

34351 **Ion plasma wave wakefield accelerators.** Jones, M.E.; Keinigs, R. (Los Alamos National Lab., Los Alamos, NM 87545). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Plasma Science;* **PS-15**: No. 2, 203-209(Apr 1987).

The possibility of using space-charge waves on ion beam or column as a wakefield accelerator is discussed. The primary advantages of using ion plasma waves over electron plasma waves are that the kinetic energy and fall-time requirements on the driving beam are reduced. One disadvantage in using a lower plasma frequency is that a larger current is required to achieve the same accelerating gradient. The basic aspects of wafefield accelerators are reviewed and this concept is analyzed in this context. Particle-in-cell simulations show that wakefields utilizing ion waves, although more complicated than plasma wakefields, can produce acceleration.

34352 **Beam loading in plasma waves.** Wilks, S.; Katsouleas, T.; Dawson, J.M.; Chen, P.; Su, J.J. (Physics Dept., Univ. of California at Los Angeles, Los Angeles, CA 90024). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Plasma Science;* **PS-15**: No. 2, 210-217(Apr 1987).

Certain key accelerator issues relevant to plasma-based accelerators are studied in this article. Analytic results for important quantities of interest, such as maximum beam current, efficiency, and energy spread will be given. These results will then be compared with one- and two-dimensional particle-in-cell (PIC) computer simulations. Special emphasis will be placed on these schemes that offer not only high accelerating gradients, but also high efficiency and small energy spread.

34353 **Conference record of the 1985 IEEE international conference on plasma science.** Piscataway, NJ; IEEE Service Center (1985). 95p. (CONF-850699—). IEEE Service Center, 445 Hoes Ln., Piscataway, NJ 08854.

From Conference on plasma sciences; Pittsburgh, PA, USA (3 Jun 1985).

This conference deals exclusively with plasma science. There are several hundred papers spanning all disciplines of plasmas. The sections include plasma chemistry, plasma diagnostics; plasmas for fusion research; laser-plasma interactions; plasma waves and instabilities; ultrafast Z pinches; plasma focus; plasma heating; electromagnetic launches; fast-opening switches and high-power microwave and submillimeter wave generation.

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REFER ALSO TO CITATION(S) 33162, 34039, 34216, 34273, 34341, 34342

34354 **(AD-A—178970/0/XAB) Nonlinear waves in the pellet fusion process.** Ervin, V.J.; Ames, W.F.; Adams, E. (Georgia Inst. of Tech., Atlanta (USA). School of Mathematics). 1984. 23p. NTIS, PC A02/MF A01.

A gas-dynamic model of the pellet fusion process having a time-invariant source term is studied by means of group analysis. Some exact solutions of this nonlinear system are constructed for specific (physical) values of parameters. The development of multiple shock waves is demonstrated in several cases analytically. Additional numerical results illustrate the evolution of singularities.

34355 **(ANL/FPP—86-1) Tokamak power systems studies, FY 1986: A second stability power reactor.** Ehst, D.; Baker, C.; Billone, M.; Brooks, J.; Buxbaum, R.; Cha, Y.; Evans, K. Jr.; Finn, P.; Gohar, Y.; Hassanein, A. (Argonne National Lab., IL (USA). Fusion Power Program). Mar 1987. Contract W-31109-ENG-38. 441p. NTIS, PC A19/MF A01; 1; GPO Dep. File Number DE87009241.

This report presents the results of the work at Argonne National Laboratory (ANL) during FY-1986 on the Tokamak Power Systems Study (TPSS). The purpose of the TPSS is to explore and develop ideas that would lead to improvements in the tokamak as a power reactor concept. The work at ANL concentrated on plasma engineering, impurity control, and the blanket/first wall/shield system. The work in FY-1986 extended these studies and focused them on a reference design point. The key features of the design point include: second stability regime with higher β and larger aspect ratio, steady-state operation with fast wave current drive, impurity control via a self-pumped slot limiter, a self-cooled liquid lithium, vanadium alloy blanket with simplified poloidal flow, and reduced reactor building volume with vertical lift maintenance. Sufficient work was carried out to report a preliminary cost estimate. In addition, reactor implications of steady-state operation in the first stability regime were also studied. 174 refs., 124 figs., 65 tabs.

34356 **(CONF-861211—26) Thermal-hydraulic limitations on water-cooled fusion reactor components.** Cha, Y.S.; Misra, B. (Argonne National Lab., IL (USA)). 1986. Contract W-31109-ENG-38. 9p. NTIS, PC A02/MF A01; GPO Dep. File Number DE87004820.

From American Society of Mechanical Engineers winter meeting; Anaheim, CA, USA (7 Dec 1986).

An assessment of the cooling requirements for fusion reactor components, such as the first wall and limiter/divertor, was carried out using pressurized water as the coolant. In order to establish the coolant operating conditions, a survey of the literature on departure from nucleate boiling, critical heat flux, asymmetrical heating and heat transfer augmentation techniques was carried out. The experimental data and the empirical correlations indicate that thermal protection for the fusion reactor components based on conventional design concepts can be provided with an adequate margin of safety without resorting to either high coolant velocities, excessive coolant pressures, or heat transfer augmentation techniques. If, however, the future designs require unconventional shapes or heat transfer enhancement techniques, experimental verification would be necessary since no data on heat transfer augmentation techniques exist for complex geometries, especially under asymmetrically heated conditions. Since the data presented herein are concerned primarily with thermal protection of the reactor components, the final design should consider other factors such as thermal stresses, temperature limits, and fatigue.

34357 **(CONF-870552—3) The ATF [Advanced Toroidal Facility] Status and Control System.** Baylor, L.R.; Devan, W.R.; Sumner, J.N.; Alban, A.M. (Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 4p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009664.

From 5. conference on real-time computer applications in nuclear particle and plasma physics; San Francisco, CA, USA (11 May 1987).

The Advanced Toroidal Facility (ATF) Status and Control System (SCS) is a programmable controller-based state monitoring and supervisory control system. This paper describes the SCS implementation and its use of a host computer to run a commercially available software package that provides color graphic interactive displays, alarm logging, and archiving of state data.

34358 **(CONF-870570—4) Modeling of compact loop antennas.** Baity, F.W. (Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 5p. NTIS, PC A02. File Number DE87009507.

From 7. topical conference on applications of radio-frequency power to plasmas; Kissimmee, FL, USA (4 May 1987).

A general compact loop antenna model which treats all elements of the antenna as lossy transmission lines has been developed. In addition to capacitively-tuned resonant double loop (RDL) antennas the model treats stub-tuned resonant double loop antennas. Calculations using the model have been compared with measurements on full-scale mockups of resonant double loop antennas for ATF and TFTR in order to refine the transmission line parameters. Results from the model are presented for RDL antenna designs for ATF, TFTR, Tore Supra, and for the Compact Ignition Tokamak (CIT).

34359 **(CONF-870570—5) The design of high-power ICRF antennas for TFTR and Tore Supra.** Hoffman, D.J.; Baity, F.W.; Bryan, W.E.; Chen, G.L.; Luk, K.H.; Owens, T.L.; Ray, J.M.; Ryan, P.M.; Swain, D.W.; Walls, J.C. (Oak Ridge National Lab., TN (USA)). 1987. Contract AC05-84OR21400. 5p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009669.

From 7. topical conference on applications of radio-frequency power to plasmas; Kissimmee, FL, USA (4 May 1987).

The Oak Ridge National Laboratory is designing, fabricating, and testing antennas for TFTR and Tore Supra. The antennas will deliver 4 MW per port to the hot plasma. The antennas' designs are nearly complete; they are backed by the results of extensive modeling, analyses, and tests of the electrical, thermal, and structural characteristics of the antennas that were carried out during the design process.

34360 **(DOE/DP/40124—1) Inertial fusion program and National Laser Users Facility projects: Annual report, 1 October 1979-30 September 1980.** (Rochester Univ., NY (USA). Lab. for Laser Energetics). Aug 1982. Contract AC08-80DP40124. 296p. NTIS MF A01; 2; GPO Dep. File Number DE87008914.

This report summarizes work performed during FY 1980 by the Laboratory for Laser Energetics of the University of Rochester under DOE Contract No. AC08-80DP40124 for four major tasks: (1) research in support of the national inertial fusion program, (2) engineering modifications to LLE facilities to support DOE research activities and users of the National Laser Users Facility, (3) activation of the OMEGA irradiation facility, and (4) operation of the National Laser Users Facility. This report discusses significant results of the past year which included: (1) demonstration of greater than 80% intrinsic energy efficiency in the frequency-tripling of 1.054 μm laser radiation to 0.351 μm, (2) an advancement in the understanding of 0.351 μm interaction physics, (3) exploding-pusher experiments that resulted in neutron yields of 1.5×10^9 for on-target power of 2 TW, (4) use of x-ray spectroscopy to measure the quality of confinement as well as the compressed fuel density, (5) implosion of thick-shell ("quasi-ablative") D-T filled targets to densities in excess of 2 g/cm³ (10X liquid D-T) with neutron-yield, density and implosion-time scaling in close agreement with 1-D calculations, (6) engineering design and implementation of frequency tripling on the Glass Development Laser, (7) activation of the OMEGA irradiation facility, and (8) development of NLUF operating procedures and programs. 219 refs., 171 figs.

34361 **(DOE/OR/00033—T294) Steerable beam systems for electron cyclotron resonance heating.** Colborn, J. (Massachusetts Inst. of Tech., Cambridge (USA); UKAEA Culham Lab., Abingdon). 31 Aug 1985. Contract AC05-76OR00033. 120p. NTIS, PC A06. File Number DE87009210.

Several methods are discussed for steering a 200 kW pencil beam of electromagnetic waves in the 60 GHz to 200 GHz frequency range. These include methods incorporating swivelling mirrors, phased arrays, mode converters, and optical materials. It is found that for the near term, the mechanical systems are best, capable of steering times of 3 ms to 100 ms and losses of less than 5%. Optical methods, as yet virtually uninvestigated, appear to offer the only means of beam-steering in the 5μs to 100μs range necessary for MHD mode tracking.

34362 **(DOE/OR/00033—T295) Investigation of operating parameters for ICRH antennas on TMX upgrade.** Whaley, D.R. (Michigan Univ., Ann Arbor (USA). Dept. of Nuclear Engineering; Lawrence Livermore National Lab., CA (USA)). 10 Nov 1985. Contract AC05-76OR00033. 86p. NTIS, PC A05. File Number DE87009209.

A primary physics and engineering concern when the design of a fusion device is being investigated is the mechanism by which the plasma particles are to be heated. The method explored in this paper is ion cyclotron resonant heating (ICRH). The equipment consists of a conducting coil external to and surrounding the confined plasma. RF power is applied to the coil, creating electromagnetic fields which propagate through the plasma provided density and frequency conditions are satisfied. The main purpose of the work presented here is determination of optimal operating parameters for various ICRH antenna designs. The response of the electromagnetic fields and power deposition profiles to plasma densities and temperatures, excitation frequencies, etc., are determined using the McVey Antenna-Plasma Coupling Code.

34363 (EUR—9618-Vol.1, pp 17-36) **Heliotron E.** Uo, K. 1985. NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803. (CONF-8409392—Vol.1).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

Recent results of the currentless plasma experiments on Heliotron E are shown. These results are comparable to present tokamaks. The Heliotron steady reactor has many advantages comparing to tokamaks. The currentless plasma experiment on Heliotron DR is explained. By ECRH, electron temperature reached was 1.9 keV in low density case and $\beta(0)$ was about 2%. n/sub e/ = 3.5 x 10/sup 13/cm/sup -3/, which is far above the cut off value, was obtained.

34364 (EUR—9618-Vol.1, pp 37-46) **Overview of the L-2 stellarator experimental results. L-2 Team and ECRH Team.** Andryukhina, E. 1985. NTIS (US Sales Only), PC A19/MF A01. File Number DE87751803. (CONF-8409392—Vol.1).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

A numerical calculation for the plasma profiles is made taking into account heat transport enhancement on the cold plasma edge. Results of ICR hydrogen plasma heating at the first harmonic are presented. The effective ion heating δT/sub i/ — 200 eV is observed when antenna is placed close to the plasma boundary. First results of ECR currentless plasma creation and heating are obtained. By using an extraordinary mode launched from the strong field side successful plasma heating to reasonable plasma parameters was demonstrated. The heating efficiency is P/sub absorb//P/sub HF/ = 50% (P/sub HF/=100kW) and depends on the plasma density growth rate during HF pulse. The currentless plasma confinement time does not differ from that for the ohmic heating.

34365 (EUR—9618-Vol.2, pp 643-655) **Technical progress report on Wendelstein VII-AS.** Sapper, J. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

The modification of the WENDELSTEIN experiment at Garching into an advanced version with modular design was approved in 1982, after a planning time of one and a half year. The essential components /1,2/ of the new WENDELSTEIN VII-AS device are: - A modular field system instead of a helix and TF-system, consisting of 45 nonplanar coils. - A modular vacuum vessel, adapted to the coil system. - An additional TF-system for t-variation, consisting of 10 plane coils. - A structure shell for the modular field coils so that the vessel is free of coil forces.

34366 (EUR—9618-Vol.2, pp 687-697) **Design study on the demountable superconducting helical coil.** Uo, K.; Motojima, O.; Nakasuga, M. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

It is necessary to use continuous helical coil to produce heliotron type magnetic field with large rotational transform and shear. Therefore we adopted a continuous superconducting helical coil in a next generation device Heliotron ES. In order to make the fabrication and maintenance easier, demountable structure of the helical coil is required. In this presentation, we show the recent result of the design study of the demountable superconducting helical coil.

34367 (EUR—9618-Vol.2, pp 729-748) **Flexible heliac.** Carreras, B.A.; Cantrell, J.L.; Garcia, L.; Harris, J.H.; Hender, T.C.; Lynch, V.E. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

The addition of an l = 1 helical winding to the heliac central conductor adds a significant degree of flexibility to the configuration by making it possible to control the rotational transform and shear. These effects are consistent with results for helically-symmetric fields, but additional helical harmonics produced by toroidal coupling may also be important. Such control is essential for an experiment because the presence of low-m resonant surfaces in or near the plasma can cause break-up of the equilibrium magnetic surfaces. The use of an additional helical winding also permits reduction of the total central conductor current, and deepens the magnetic well at low aspect ratio.

34368 (EUR—9618-Vol.2, pp 749-761) **Configuration studies with respect to W VII-X.** Harmeyer, E.; Kisslinger, J.; Rau, F.; Wobig, H. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

Configurations with helical axis are studied with the aim to find modular coils instead of interlinked circular coils. For this purpose an analytic winding law describing twisted coils has been defined. Starting from a general helical and closed curve a reference plane put up either by two vectors e/sub Z/ and e/sub R/ or by the normal and binormal vector of the axis in defined from where on the warping of the coils is measured. Radius and amplitudes of the coils are represented in a Fourier series.

34369 (EUR—9618-Vol.2, pp 763-775) **On modular stellarator reactor coils.** Rau, F.; Harmeyer, E.; Kisslinger, J.; Wobig, H. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

Modular twisted coils are discussed which produce magnetic fields of the Advanced Stellarator WENDELSTEIN VII-AS type. Reducing the number coils/FP offers advantage for maintenance of coils, but increases the magnetic ripple and B/sub m//B/sub o/. Computation of force densities within the coils of ASR and ASB yield local maximum values of about 80 and 180 MN/m/sup 3/, respectively. A system of mutual coil support is being developed. Twisted coils in helical arrangement provide a reactor-sized HELIAC system. In order to reduce the magnetic ripple, a large number of 14 coils/FP in special arrangement is used.

34370 (EUR—9618-Vol.2, pp 673-678) **Effect of plasma pressure limit on stellarator-reactor properties.** Danilkin, I.S. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

The object of the present paper is a parametric study of reactor-stellarator including the plasma pressure effect on the plasma confinement instead of the fixed beta limit. The lowest order effect that is the displacement of the minor plasma cross-section is considered. The analysis applies to a l=2-stellarator having the concept close to ideology of "L-2", "ATF" and (may be) H-E.

34371 (EUR—9618-Vol.2, pp 699-715) **Optimization studies for a Heliac device.** Ellis, R.A. Jr. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

During the past year an attempt to refine the Heliac design was carried out to provide a replacement device for PLT and PBX. The comparable parameters of the new design are shown. The principal differences are the increased number of field periods and the larger magnetic field. The critical element is the toroidal current ring that must carry very large currents. Some sketches of feasibility studies for TF coils and the current ring are shown. No problems are anticipated for the vacuum system and vertical field coils... We have based our design on plane circular coils because of the ease of fabrication and the convenience of computing magnetic fields. It is clear that an examination of other configurations together with auxiliary helical windings must be considered. It remains for us to remove the limitation on β due to island formation by non-linear coupling of vacuum field modes by Pfirsch-Schlueter currents. Our work so far has not yielded an optimal configuration.

34372 (EUR—9618-Vol.2, pp 561-562) **Proposed versatile stellarator facility.** Hamberger, S.M.; Sharp, L.E. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

34373 (EUR—9618-Vol.2, pp 583-596) **Design and status of ATF.** Jernigan, T.C. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

The Advanced Toroidal Facility is a large continuous coil torsatron now under construction at ORNL. Operation is scheduled for October 1986. ATF is designed to test high beta plasma confinement. Its parameters are: l = 2, m = 12; R/sub o/ = 2.1, a = 0.3 m, and B/sub o/ = 2 T for 5 s or 1 T continuously. Initial plasma heating will utilize the ISX-B neutral beam injectors (4.5 MW, 40 keV for 300 ms) and the modified ISX-B ECH system (200 kW, 60 GHz for 100 ms).

34374 (EUR—9618-Vol.2, pp 597-624) **Status of the ATF program.** Lyon, J.F. 1985. NTIS (US Sales Only), PC A17/MF A01. File Number DE87751804. (CONF-8409392—Vol.2).

From IAEA technical committee meeting on plasma confinement and heating in stellarators; Schloss Ringberg, F.R. Germany (24 Sep 1984).

Technical progress during the last year has led to increased confidence in ATF performance. The ATF 1 = 2 torsatron, scheduled to operate in October 1986, will have R = 2.1 m, a = 0.3 m, B = 1 T steady state and B = 2 T for 5 -10 seconds. A wide range of magnetic configurations are accessible on ATF by varying the relative currents in the three sets of poloidal field coils and in the two separate helical windings. In the transport area, modest electric fields (ePHI — >T) of either sign dramatically reduce direct orbit losses and improve confinement (chi/sub i/ — υ^*) at intermediate values of υ^* (— < 10). ATF plasma heating will use: ECH - 0.2 MW, 53.2 GHz CW with an additional 0.2 MW at 53.2 GHz CW or 0.4 MW, 28 GHz CW as backup; ICRF - 0.4 MW, 5 - 30 MHz CW with 1.5 MW, 40 - 80 MHz CW as backup; and NBI - 4.5 MW, 40 - 50 kV, 0.3 - 0.5 s pulse with 30 s injection at lower power as backup. Collisionless particle orbit studies with the accurate ATF wall geometry show that trapped particles do not hit the ATF wall (no collisionless loss cone) and that the closest approach is in a helical strip between helical coils on the small major radius side where ports are conveniently located.

34375 (HEDL—7647) **The FUBR-1B experiment and BEATRIX-I.** Hollenberg, G.W.; Knight, R.C.; Pember, L.A.; Johnson, C.E.; Poeppel, R.B.; Yang, L. (Hanford Engineering Development Lab., Richland, WA (USA)). Jan 1987. Contract AC06-76FF02170. 7p. NTIS, PC A02. File Number DE87009525.

The objective of this work is to irradiate lithium ceramics in a fast neutron environment to high burnup levels and with large temperature gradients. The first insertion of two subassemblies completed its irradiation in December 1986. This irradiation exposed Li_2O and LiAlO and LiA102 to not only high temperatures but also large temperature gradients which are expected in fusion blankets. In addition, it included other materials such as Li_2ZrO_3, Li_8ZrO_6, Li_4SiO_4, and $LiAlO_2$ (spheres and large grain size) some of which will go to high burnups.

34376 (HEDL—7654) **The critical radius for void nucleation in neutron-irradiated ferritic alloy, HT-9.** Coghlan, W.A.; Gelles, D.S. (Hanford Engineering Development Lab., Richland, WA (USA)). Mar 1987. Contract AC06-76FF02170. 14p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009522.

Experimental measurements of cavity formation in HT-9 following irradiation to 39 dpa at 300, 400, 500 and 600°C are used as a basis for examining the critical radius for void nucleation model as applied to ferritic alloys. Calculations demonstrate that the value for critical radius following irradiation at 400°C can be predicted, that values for critical radius at 500 and 600°C are in agreement with experiment but that values for critical radius at 300°C are below experimental values. Calculations are compared with those on a ferritic alloy following ion bombardment. Possible explanations are suggested.

34377 (HEDL—7655) **Charpy impact test results of ferritic alloys from the HFIR[High Flux Isotope Reactor]-MFE-RB2 test.** Hu, W.L.; Gelles, D.S. (Hanford Engineering Development Lab., Richland, WA (USA)). Mar 1987. Contract AC06-76FF02170. 8p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009521.

Miniature Charpy specimens of HT-9 in base metal, weld metal and heat affected zone (HAZ) metal conditions, and 9Cr-1Mo in base metal and weld metal conditions have been tested following irradiation in HFIR-MFE-RB2 at 55°C to ≈10 dpa. All specimen conditions have degraded properties (both DBTT and USE) in comparison with specimens irradiated to lower dose. 9Cr-Mo degraded more than HT-9 and weld metal performed worse than base metal which performed worse than HAZ material. Property degradation was approximately linear as a function of dose, indicating that degradation response had not saturated by 10 dpa.

34378 (IAE—4292/6) **Open mirrors with orthogonal geometry magnetic field.** Skovoroda, A.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1986. 13p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702275.

Data available at present on orthogonal magnetic configurations of open mirrors are considered to obtain practical recommendations useful for their development. Notion of existence of multimirror magnetic surface is introduced and invariant embedding is obtained. Necessity for test checking of magnetic system orthogonalization effect actualizes search for simple schemes for simulation experiments. For this purpose a possibility of using plane elliptic turns is analysed. 12 references, 2 figures.

34379 (INIS-mf—10902, pp 19) **Neutron physical aspects in the development of DT fusion reactor blankets.** Rabitsch, H. Dec 1986. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702298.

In Annual report (October 1985 - September 1986).

34380 (INIS-mf—10902, pp 12-13) **Evaluation of advanced fusion fuels.** Heindler, M.; Kernbichler, W.; Feldbacher, R. Dec 1986. (In German). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702298.

In Annual report (October 1985 - September 1986).

34381 (IPPCZ—254, pp 30-37) **Power spectra of the new grills for the T-7 tokamak.** Preinhaelter, J. Oct 1985. NTIS (US Sales Only), PC A04/MF A01. File Number DE87702303. (CONF-8505352—).

From Joint Czechoslovak-Soviet workshop on current drive in tokamaks; Liblice, Czechoslovakia (15 May 1985).

Two four-waveguide grills of an operating frequency of 2.45 Gcps currently under construction are planned for new experiments on lower-hybrid current drive in the T-7 tokamak. One should transmit the main power, the other only the part containing strongly slowed-down waves. The waveguide widths are 14 mm for one grill and 7 mm for the other. In the paper the power spectra and the total reflectivities of the grills, as well as the reflected power distributions between input waveguides are computed for various phase shifts between incident waves and two values of surface plasma density. As the effect of the wall corrugation is found to be relatively small, most computations are performed for the grills imbedded in a smooth wall. The much stronger effect of surface plasma density is discussed. (J.U.).

34382 (KFK—4075) **Report on research and development work 1985 on the nuclear fusion project. Annual report of the Association KfK-Euratom.** Finken, D. (comp.). (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Kernfusion). May 1986. 65p. (In German). (EUR—9614-d). NTIS (US Sales Only), PC A04/MF A01. File Number DE87751922.

The Nuclear Research Centre Karlsruhe and the Max Planck Institute for Plasma Physics together form the Nuclear Fusion Development Association. The partners collaborate with the aim of creating the physical and technical preconditions for the use of the energy released by nuclear fusion and to plan and carry out future large-scale experiments. The work of the Nuclear Research Centre Karlsruhe on fusion with magnetic containment is included in the nuclear fusion project and is part of the European fusion technology programme. The work is supported by an association contract between KfK and Euratom by the European Commission. Connections are built up between areas of work and new projects are prepared by supplementary KfK contributions, mostly studies. This is done with regard to the expansion of the technology programme to be expected for future years and the planning activities for NET. The reports collected here are contributions of the KfK institutes in 1985. The appendix contains a list of the tasks which KfK has taken over from the fusion technology programme of the EEC. References to the institutes' contributions make the assignment of textual contributions easier.

34383 **(NIIEFA-P-A—0726) Study on the transients in shock-excited homopolar generators with account of transverse motion of an anchor.** Kharitonov, V.V. (Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad (USSR)). 1985. 26p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702393.

Transients in shock-excited cylindrical type homopolar generator (SHG) with annular magnetic circuit, taking place during its discharge on loading without special control of excitation current, are analyzed. Current-carrying elements of SHG anchor circuit are produced in the form of coaxially arranged ferromagnetic hollow cylinders or hollow and massive cylinders. When calculating the transients, the transverse magnetization of SHG current-carrying element material by discharge current field is realized. Results of numerical solution of the problem are presented in the form of a series of diagrams in similarity criterion, permitting to evaluate the effect of the anchor transverse reaction on electric power characteristics of SHG discharge. 5 references, 8 figures.

34384 **(NIIEFA-P-B—0683) Measurement equipment for investigation of large superconducting magnet systems.** Zhelamskij, M.V.; Lebedev, A.A.; Trokhachev, G.V. (Tsentral'nyj Nauchno-Issledovatel'skij Inst. Informatsii i Tekhniko-Ehkonomicheskikh Issledovanij po Atomnoj Nauke i Tekhnike, Moscow (USSR)). 1985. 9p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702394.

Structure of information-measuring complex for investigation of large superconducting magnet systems is described. Peculiarities of construction are enumerated, requirements for measuring equipment are formulated. Fields of complex application are determined. Results of the complex first utilization obtained while testing the T-15 toroidal coil experimental unit are described. 9 references, 3 figures.

34385 **(SAND—87-0140C) A shot parameter specification subsystem for automated control of PBFA-II [Particle Beam Fusion Accelerator 2] accelerator shots.** Spiller, J.L. (Sandia National Labs., Albuquerque, NM (USA)). 1987. Contract AC04-76DP00789. 3p. (CONF-870656—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE87005530.

From 6. Institute of Electrical and Electronic Engineers pulsed power conference; Arlington, VA, USA (29 Jun 1987).

An integral part of the automatic control system developed for the Particle Beam Fusion Accelerator 2 (PBFA-2) by the Control Monitor Software Development Team is the Shot Specification Subsystem. This system has been designed to fully utilize the accelerator by tailoring shot parameters to the needs of the experimenters. The Shot Specification Subsystem is the key to this flexibility. Automatic systems will be required on many pulsed power machines for the fastest turnaround, the greatest reliability, and the most cost effective operation. These systems will require the flexibility and ease of use that is part of the Shot Specification Subsystem. The PBFA-2 control system has proved to be an effective modular system, flexible enough to meet the demands of the fast track construction of PBFA-2 and the control needs of Hermes-3 at the Simulation Technology Laboratory. This system is expected to meet the demands of any future machine changes.

34386 **(SAND—87-1120) Analytic theory of the Rayleigh-Taylor instability in a uniform density plasma-filled ion diode.** Hussey, T.W.; Payne, S.S. (Sandia National Labs., Albuquerque, NM (USA)). Apr 1987. Contract AC04-76DP00789. 23p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009535.

The J-vector x B-vector forces associated with the surface current of a plasma-filled ion diode will accelerate this plasma fill toward the anode surface. It is well known that such a configuration with a high I is susceptible to the hydromagnetic Rayleigh-Taylor instability in certain geometries. A number of ion diode plasma sources have been proposed, most of which have a falling density going away from the wall. A somewhat more unstable case, however, is that of uniform density. In this report we attempt to establish an upper limit on this effect with a simple analytic model in which a uniform-density plasma is accelerated by the magnetic field anticipated in a PBFA-II diode. We estimate the number of linear e-foldings experienced by an unstable surface as well as the most damaging wavelength initial perturbation. This model, which accounts approximately for stabilization due to field diffusion, suggests that even with a uniform fill, densities in excess of a few 10^{15} are probably not damaged by the instability. In addition, even lower densities might be tolerated if perturbations near the most damaging wavelength can be kept very small.

34387 **(UCRL—15872-Vol.1) SAFIRE: A systems analysis code for ICF [inertial confinement fusion] reactor economics.** McCarville, T.J.; Meier, W.R.; Carson, C.F.; Glasgow, B.B. (TRW, Inc., Redondo Beach, CA (USA); Lawrence Livermore National Lab., CA (USA)). 12 Jan 1987. 78p. NTIS, PC A05/MF A01; 1; GPO Dep. File Number DE87009570.

The SAFIRE (Systems Analysis for ICF Reactor Economics) code incorporates analytical models for scaling the cost and performance of several inertial confinement fusion reactor concepts for electric power. The code allows us to vary design parameters (e.g., driver energy, chamber pulse rate, net electric power) and evaluate the resulting change in capital cost of power plant and the busbar cost of electricity. The SAFIRE code can be used to identify the most attractive operating space and to identify those design parameters with the greatest leverage for improving the economics of inertial confinement fusion electric power plants.

34388 **(UCRL—15872-Vol.2-Suppl.1) A new heavy-ion-beam driver model for the SAFIRE code.** Meier, W.R. (Schafer (W.J.) Associates, Inc., Pleasanton, CA (USA); Lawrence Livermore National Lab., CA (USA)). 13 Mar 1987. Contract W-7405-ENG-48. 17p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87009572.

The heavy-ion-beam driver model that was developed by McDonnell Douglas Astronautics Corporation as part of the Heavy Ion Fusion System Assessment study has been incorporated into the SAFIRE code. The model calculates the cost and performance of an induction linear accelerator and the beam transport systems required to deliver the beam to the fusion chamber. The results are used within the SAFIRE code for economic evaluation of inertial confinement fusion electric power plants. This report briefly describes the subroutines that make up the driver model, defines the variables that were added to the SAFIRE code, and gives an example of the output for a calculation using the new driver model.

34389 **(UCRL—93208) Cryogenic systems for the Mirror Fusion Test Facility.** Slack, D.S.; Nelson, R.L.; Chronis, W.C. (Lawrence Livermore National Lab., CA (USA); Varian Associates, Santa Clara, CA (USA)). Aug 1985. Contract W-7405-ENG-48. 25p. (CONF-850814—42). NTIS, PC A02. File Number DE87008725.

From Cryogenic engineering conference and international cryogenic materials conference; Boston, MA, USA (12 Aug 1985).

This paper includes an in-depth discussion of the design, fabrication, and operation of the Mirror Fusion Test Facility (MFTF) cryogenic system located at Lawrence Livermore National Laboratory (LLNL). Each subsystem discussed to present a basic composite of the entire facility. The following subsystems are included: 500kW nitrogen reliquefier, subcoolers, and distribution system; 15kW helium refrigerator/liquefier and distribution system; helium recovery and storage system; rough vacuum and high vacuum systems.

34390 **(UCRL—94868) A comparison of the heat transfer capabilities of two manufacturing methods for high heat flux water-cooled devices.** McKoon, R.H. (Lawrence Livermore National Lab., CA (USA)). Oct 1986. Contract W-7405-ENG-48. 8p. (CONF-861183—2). NTIS, PC A02/MF A01; GPO Dep. File Number DE87009568.

From Conference on electron beam melting and refining state of the art 1986; Reno, NV, USA (2 Nov 1986).

An experimental program was undertaken to compare the heat transfer characteristics of water-cooled copper devices manufactured via conventional drilled passage construction and via a technique whereby molten copper is cast over a network of preformed cooling tubes. Two similar test blocks were constructed;

one using the drilled passage technique, the other via casting copper over Monel pipe. Each test block was mounted in a vacuum system and heated uniformly on the top surface using a swept electron beam. From the measured absorbed powers and resultant temperatures, an overall heat transfer coefficient was calculated. The maximum heat transfer coefficient calculated for the case of the drilled passage test block was 2534 Btu/hr/ft²/°F. This corresponded to an absorbed power density of 320 w/cm² and resulted in a maximum recorded copper temperature of 346°C. Corresponding figures for the cast test block were 363 Btu/hr/ft²/°F, 91 w/cm², and 453°C.

34391 **Resonant-cavity antenna for plasma heating.** Perkins, F.W. Jr.; Chiu, S.C.; Rawls, J.M. (to The United States of America as represented by the United States Dept. of Energy, Washington, DC). US Patent 4,661,304. 28 Apr 1987. Filed date 10 Jan 1984. vp.

This patent describes a magnetic confinement plasma device having a plasma. The plasma is immersed in a strong magnetic field and confined within an evacuated plasma chamber. A wave launcher for launching electromagnetic waves in the range of frequencies of 10 MHz to 200 MHz energizes and thereby heats the plasma. The wave launcher is spaced-apart from the plasma. The wave launcher comprises: a resonant cavity, including resonant chamber walls for containing electromagnetic fields; connection means connecting the resonant cavity to a transmission line carrying electromagnetic wave energy to the resonant cavity; at least one capacitive reactive element, and at least one inductive reactive element disposed within the resonant cavity; the capacitive reactive member separated from the chamber walls of the resonant cavity by a first predefined gap, with the capacitive reactive member and the chamber walls of the resonant cavity oriented approximately tangential to the strong magnetic field; the capacitive and the inductive reactive elements spaced apart from the plasma a second predetermined distance which at least partially determines the frequency of the launched waves; and the resonant cavity cooperating with the capacitive and the inductive reactive elements so as to launch electromagnetic waves in the range of frequencies, toward the plasma.

34392 **Method and apparatus for distributing coolant in toroidal field coils.** Schuster, J.R.; Lee, C.Y.; Weggel, C.F. (to FDX Patents Holding Co., N.V., New York, NY). US Patent 4,657,723. 14 Apr 1987. Filed date 1 Feb 1985. vp.

This patent describes a tokamak reactor having a toroidal field coil assembly enclosing a generally toroidal shaped region having a toroidal axis. The toroidal field coil assembly comprises generally flat-washer shaped magnetic coils having generally flat opposing radial faces with respect to the toroidal axis. A cooling arrangement distributes coolant in the toroidal field coil assembly. The cooling arrangement comprises for each coil: (a) coolant channels for flowing coolant in the same direction through an interior of the coil, the coolant channels embedded within the coil and having inlets and outlets opening on a face of the coil, (b) the inlet and outlet openings disposed adjacent opposite ends of the coil and arranged radially along the coil face with respect to the toroidal axis, (c) a single inlet header formed in part by the soil face containing the inlet openings and in part by a curved supply conduit having a longitudinal opening along the length thereof, (d) a single outlet header formed in part by the coil face containing the outlet openings and in part by a curved return conduit having a longitudinal opening along the length thereof, and (e) the supply and return conduits each having longitudinal edges along their longitudinal openings, the edges being secured to respective portions of the coil face containing the inlet and outlet openings, such as by welding or brazing.

34393 **Recovery of tritium from tritiated molecules.** Swansiger, W.A. (to Dept. of Energy, Washington, DC). US Patent 4,657,747. 14 Apr 1987. Filed date 17 Oct 1984. vp.

A method is described of removing tritium from a mixture of tritiated molecules of primarily water comprising the steps of: (a) Precharging a reactor chamber having first and second ends with a mixture of uranium particles and an inert substance within the side walls thereof; (b) Preheating the reactor chamber to at least 500°C; (c) Preheating the tritiated water to a temperature of at least 500°C to convert the water to superheated steam; (d) Injecting the steam into the first end of the reactor chamber to produce a traveling front, highly excelthermic reaction zone of temperatures in excess of 900°C from the first end of the reactor to the second end thereof. This results in substantially complete decomposition of the steam to remove tritium therefrom, and substantially complete conversion of the uranium to uranium dioxide. The inert substance serves as an insulator and a diluent to allow for volumetric expansion of the uranium as it reacts with the steam; and (e) Recovering tritium from the second end of the reactor chamber.

34394 **Fusion technology for a magnetic fusion production reactor.** Campbell, R.B.; Jassby, D.L.; Freije, S.A. (TRW Corp., Redondo Beach, CA). *Journal of Fusion Energy;* **6**: No. 1, 5-57(Mar 1987). Contract W-7405-ENG-48.

The tandem mirror and tokamak are being considered as candidate fusion drivers for a materials production reactor that could be implemented in the 1990s. This report considers, in detail, the required performance characteristics of the fusion plasma and the major technological subsystems for each fusion driver. These performance characteristics are compared with the present state of the art, corresponding development needs are identified, and technology program requirements, in addition to those now being supported by the Department of Energy, are pointed out. The tandem mirror and tokamak fusion drivers are also compared with regard to their required advancements in plasma performance and technology development.

34395 **Economic analysis of a magnetic fusion production reactor.** Lee, J.D. (Lawrence Livermore National Lab., CA). *Journal of Fusion Energy;* **6**: No. 1, 59-64(Mar 1987). Contract W-7405-ENG-48.

The magnetic fusion reactor for the production of nuclear weapon materials, based on a tandem mirror design, is estimated to have a capital cost of $1.5 billion and to produce 10 kg of tritium/year for $22,000/g or 940 kg/year of plutonium in the plutonium mode for $250/g plus heavy metal processing. A tokamak-based design is estimated to cost $1.5 billion and to produce 10 kg of tritium/year for $29 thousand/g. For comparison, a commercially sized tandem mirror fusion breeder selling excess electricity and fissile material to commercial markets is estimated to cost $3.6 billion and to produce tritium for $2.6 thousand/g and plutonium for $34/g plus heavy metal processing.

34396 **Selection of a toroidal fusion reactor concept for a magnetic fusion production reactor.** Jassby, D.L. (Princeton Plasma Physics Lab., NJ). *Journal of Fusion Energy;* **6**: No. 1, 65-88(Mar 1987). Contract W-7405-ENG-48.

The basic fusion driver requirements of a toroidal materials production reactor are considered. The tokamak, stellarator, bumpy torus, and reversed-field pinch are compared with regard to their demonstrated performance, probably near-term development, and potential advantages and disadvantages if used as reactors for materials production. Of the candidate fusion drivers, the tokamak is determined to be the most viable for a near-term production reactor. Four tokamak reactor concepts (TORFA/FED-R, AFTR/ZEPHYR, Riggatron, and Superconducting Coil) of approximately 500-MW fusion power are compared with regard to their demands on plasma performance, required fusion technology development, and blanket configuration characteristics. Because of its relatively moderate requirements on fusion plasma physics and technology development, as well as its superior configuration of production blankets, the TORFA/FED-R type of reactor operating with a fusion power gain of about 3 is found to be the most suitable tokamak candidate for implementation as a near-term production reactor.

34397 **Feasibility study of a magnetic fusion production reactor.** Moir, R.W. (Lawrence Livermore National Lab., CA). *Journal of Fusion Energy;* **5**: No. 4, 257-269(Dec 1986). Contract W-7405-ENG-48.

A magnetic fusion reactor can produce 10.8 kg of tritium at a fusion power of only 400 MW - an order of magnitude lower power than that of a fission production reactor. Alternatively, the same fusion reactor can produce 995 kg of plutonium. Either a to-

kamak or a tandem mirror production plant can be used for this purpose; the cost is estimated at about $1.4 billion (1982 dollars) in either case. (The direct costs are estimated at $1.1 billion.) The production cost is calculated to be $22,000/g for tritium and $260/g for plutonium of quite high purity (1% ^{240}Pu). Because of the lack of demonstrated technology, such a plant could not be constructed today without significant risk. However, good progress is being made in fusion technology and, although success in magnetic fusion science and engineering ishard to predict with assurance, it seems possible that the physics basis and much of the needed technology could be demonstrated in facilities now under construction. Most of the remaining technology could be demonstrated in the early 1990s in a fusion test reactor of a few tens of megawatts. If the Magnetic Fusion Energy Program constructs a fusion test reactor of approximately 400 MW of fusion power as a next step in fusion power development, such a facility could be used later as a production reactor in a spinoff application. A construction decision in the late 1980s could result in an operating production reactor in the late 1990s.

34398 **Mechanical design of a magnetic fusion production reactor.** Neef, W.S.; Jassby, D.L. (Lawrence Livermore National Lab., CA). *Journal of Fusion Energy;* **5**: No. 4, 271-316(Dec 1986). Contract W-7405-ENG-48.

The mechanical aspects of a tandem mirror and tokamak concepts for the tritium production mission are compared, and a proposed breeding blanket configuration for each type of reactor is presented in detail, along with a design outline of the complete fusion reaction system. In both cases, the reactor design is developed sufficiently to permit preliminary cost estimates of all components. A qualitative comparison is drawn between both concepts from the view of mechanical design and serviceability, and suggestions are made for technology proof tests on unique mechanical features. Detailed cost breakdowns indicate less than 10% difference in the overall costs of the two reactors.

34399 **Nuclear design and analysis of a magnetic fusion production reactor.** Lee, J.D. (Lawrence Livermore National Lab., CA). *Journal of Fusion Energy;* **5**: No. 4, 317-326(Dec 1986). Contract W-7405-ENG-48.

Tandem-mirror- and tokamak-based magnetic fusion production reactors are predicted to have tritium breeding ratios of 1.67 and 1.49. respectively. The latter value replaces one (1.56) that is used elsewhere in the sequence of papers in this issue. Blanket energy multiplication for both is predicted to be about 1.3. With the tandem mirror operating in the plutonium production mode, the net plutonium-plus-tritium breeding ratio is 1.74. Blanket energy multiplication for the plutonium mode is predicted to be 2.4 at a plutonium-uranium ratio of 0.7% and a uranium volume fraction of 3%.

34400 **Radiation effects in Be and Al for a magnetic fusion production reactor.** Mitchell, J.B. (Lawrence Livermore National Lab., CA). *Journal of Fusion Energy;* **5**: No. 4, 327-331(Dec 1986). Contract W-7405-ENG-48.

Estimates of the expected performance of beryllium and several aluminum alloy structural components of the breeding blanket of a magnetic fusion production reactor are made based on the known behavior and properties of these materials in fission reactor applications. Comparisons of the irradiation damage effects resulting from the fission reactor neutron spectra and the fusion reactor blanket spectra indicate that beryllium will perform well in the breeding blanket for at least one year and the aluminum alloy 5052 will retain structural integrity for about 5 years.

99 GENERAL AND MISCELLANEOUS

34401 **(OEFZS—4386) Consoldating conservation of agricultural tools from the Austrian Museum of Folklore.** Schaudy, R.; Slais, E. (Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H.). Mar 1987. 20p. (In German). (CH—367/87). NTIS (US Sales Only), PC A02/MF A01. File Number DE87702402.

The consolidation and restoration of a variety of wooden agricultural and farmer's tools like rakes, pitchforks, scythes, wagon shafts, a dung-fork and a baker's peel is described. Problems occurred during impregnation and the following curing by gamma radiation. The solution of these problems is discussed as is the restoration of the fragmented tools.

34402 **(SAND—87-1347C) Effect of foreign nationals on federally-supported laboratories.** Kuswa, G.W. (Sandia National Labs., Albuquerque, NM (USA)). May 1987. Contract AC04-76DP00789. 29p. (CONF-8706107—1). NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87009730.

From Workshop on international exchange and movement of engineers; Washington, DC, USA (29 Jun 1987).

Foreigners contribute to the US technical development as individuals but their presence in our universities sometimes inhibits cooperative research programs with government and industry. Foreigners are not generally denying opportunity for US citizens, but we may find it advantageous to place more incentives for citizens to follow advanced technical careers. In some cases, the pool of US citizens with advanced technical degrees is small enough that our laboratories must seek foreign talent when citizens would be preferable.

9901 Management

34403 **(NUREG—1271) Guidelines and procedures for the International Code Assessment and Applications Program.** (Nuclear Regulatory Commission, Washington, DC (USA). Div. of Reactor and Plant Systems). Apr 1987. 75p. NTIS, PC A04/MF A01 - GPO. File Number TI87900637.

This document presents the guidelines and procedures by which the International Code Assessment and Applications Program (ICAP) will be conducted. The document summarizes the management structure of the program and the relationships between and responsibilities of the United States Nuclear Regulatory Commission (USNRC) and the international participants. The procedures for code maintenance and necessary documentation are described. Guidelines for the performance and documentation of code assessment studies are presented. An overview of an effort to quantify code uncertainty, which the ICAP supports, is included.

34404 **(OEFZS—4365e) Report 1985 of the Austrian Research Centre Seibersdorf. Abridged version.** Schwach, G.W. (Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H. Stabsabteilung Forschungsplanung und Technologieprognose). (Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H.). Jan 1987. 29p. (FO—36/87). NTIS (US Sales Only), PC A03/MF A01. File Number DE87702399.

The report gives a short survey of the work carried out by the Austrian Research Centre Seibersdorf in 1985. The working programme comprises five main areas: Energy and safety; Materials research, isotope and radiation techniques; Measuring techniques and information processing; Environmental protection, health and food; Industrial consulting.

34405 **(ORNL—6340) Recommended CAI approach for the NALDA system.** Duncan, L.D.; Halsey, P.J.; Handler, B.H.; MacGregor, D.S.; Sparks, S.G. (Oak Ridge National Lab., TN (USA)). Apr 1987. Contract AC05-84OR21400. 284p. NTIS, PC A13/MF A01; 1; GPO Dep. File Number DE87010142.

An extensive analysis has been completed of the applicability of computer aided instruction (CAI) for the Naval Aviation Logistics Data Analysis (NALDA) system. The objectives is to correct the deficiencies outlined in the NALDA Mission Elements Needs Statement (MENS), dated January 22, 1986. Phase I involved investigating the current NALDA operations and user base, evaluating alternatives for CAI, and making recommendations to the Naval Aviation Logistics Center (NALC), the agency with designated responsibility for NALDA. The ORNL team interviewed 91 NALDA users representing 14 sites or major organizations, or approximately half of the end-users listed in the NALDA User Directory of September 1986. The results of these interviews are reported, including information on current user characteristics, their experiences in learning and using NALDA, their training needs, and other influences on their effectiveness in using the NALDA system.

Based on a profile of the "typical" NALDA user, recommendations are made for the overall approach to CAI for the NALDA system, including a proposed curriculum outline, selection of the most appropriate authoring system, and a method of implementing the recommended functionality.

34406 **(UCID—21011-Vol.6) Installation/user's guide Version 1.0 for DOEDEF Translator Module Pool A.** Wimple, C. (Lawrence Livermore National Lab., CA (USA)). 1 Jun 1987. Contract W-7405-ENG-48. 106p. NTIS, PC A06/MF A01; 1; GPO Dep. File Number DE87010692.

The Department of Energy Data Exchange Format (DOEDEF) Translator Module Pool A (hereafter referred to as the "pool") is intended to reduce the manpower required to rewrite the DOEDEF translator software already in existence throughout the Department of Energy Nuclear Weapons complex (DOE NWC). Each portion of the DOEDEF exchange system and therefore each site's DOEDEF translator software must be rewritten during the transition from Phase 1.0 to Phase 1.5 of DOEDEF. By providing a pool, the effort required to move from Phase 1.0 to Phase 1.5 can be reduced throughout the NWC.

9902 Mathematics And Computers

REFER ALSO TO CITATION(S) 34071

34407 **(ANL—87-4) A theory of program correctness, and algorithms for proofs.** Gabriel, J.R.; Chapman, R.O.; Kljaich, J.L. (Argonne National Lab., IL (USA)). Jan 1987. Contract W-31109-ENG-38. 18p. NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010152.

A model of program correctness is given where a problem domain is defined by its language, variable names, and an abstract machine defining the semantics of the language. The set of all computations in this domain is shown to be a semigroup. A corresponding statement is true of a more general programming language. A program P in the general language is an element of the semigroup. If P performs computations in some domain, a connection can be established between P and the semigroup of computations in that domain. Methods already used in proofs about hardware are shown to be useful in proofs about this software model. The paradigm is capable of reasoning about multiprocessor hardware and of "proving" theorems about execution times, that is, "performance."

34408 **(BDX—613-3758) Management of numerical control data from the ICEM DDN products.** Rossini, B.F. (Allied Corp., Kansas City, MO (USA). Bendix Kansas City Div.). Apr 1987. Contract AC04-76DP00613. 9p. (CONF-8704126—1). NTIS, PC A02/MF A01; GPO Dep. File Number DE87009391.

From VIM conference; Ottawa, Canada (27 Apr 1987).

NCPART is a procedure developed by the Numerical Control Department at Bendix Kansas City Division to handle the entry to and exit from ICEM DDN, and process all of the local files output by ICEM DDN. The NCPART procedure is menu driven, and provides automatic access to ICEM DDN and any files necessary to process information with ICEM for Numerical Control users. Basically, the procedure handles all of the ICEM DDN operations that involve operating system commands, and frees the NC Programmer to concentrate on his/her work as a programmer. Most NC Programmers at BKC are well versed in the use of operating system commands for attaching and cataloging files, but the use of procedures makes the programmer's job much simpler, especially in the case of ICEM, where multiple files must be present in order to take advantage of the available features. Also, much is dependent on what an individual plans to do once in ICEM, because different applications require different files, and all of these files may not be needed at any given user session.

34409 **(BNL—39536) Design of pole assignment using m-order compensators.** Zhang, Shou-Yuan. (Brookhaven National Lab., Upton, NY (USA)). 1987. Contract AC02-76CH00016. 6p. (CONF-870694—1). NTIS, PC A02. File Number DE87008199.

From American control conference; Minneapolis, MN, USA (10 Jun 1987).

In this paper, some results of pole assignment by using m-order compensators in single-loop configurations with transfer function approach are presented. The results are tightly related to the property of observability indices of the plant. In particular, it is proven that by using m-order output feedback compensators, m+E/sub m/ closet-loop poles can be almost arbitrarily assigned, where E/sub m/ is determined by m and the observability indices of the plant. A complete parametrization for the characteristic polynomial of the feedback system in the multi-input multi-output case is indicated, which can be used to assign more poles. The proofs of the results are the constructive design procedures.

34410 **(BNL—39806) Distributed data acquisition for BNL802 I: The front end.** LeVine, M.J.; Watson, W.A. III; von der Schmitt, H.; Kaufman, S. (Brookhaven National Lab., Upton, NY (USA); Heidelberg Univ. (Germany, F.R.). Physikalisches Inst.; Argonne National Lab., IL (USA)). 1987. Contract AC02-76CH00016. 6p. (CONF-870552—6). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010445.

From 5. conference on real-time computer applications in nuclear particle and plasma physics; San Francisco, CA, USA (11 May 1987).

The BNL experiment 802 acquisition system comprises three VME crates. Data from Camac- and Fastbus-resident digitizers is collected via 68000-based intelligent Camac interfaces and via a Fastbus-VMX DMA engine. Complete events are shipped to processor elements (68020 / 68881) for formatting and third-level trigger decisions before transmission to the VAX host.

34411 **(BNL—39807) Distributed data acquisition for BNL802 II: Software.** Watson, W.A. III; LeVine, M.J. (Brookhaven National Lab., Upton, NY (USA)). 1987. Contract AC02-76CH00016. 4p. (CONF-870552—11). NTIS, PC A02/MF A01; GPO Dep. File Number DE87010446.

From 5. conference on real-time computer applications in nuclear particle and plasma physics; San Francisco, CA, USA (11 May 1987).

Multiple processes running on a VAX and on VME-based processors allow up to 16 detector sub-systems to run independently or coupled, with an aggregate throughput of 600 Kbytes/sec. VMS facilities are used extensively for command definition, message passing, controlling access to CAMAC and high voltage modules, and maintaining shared data structures.

34412 **(BNL—39808) The trigger supervisor: Managing triggering conditions in a high energy physics experiment.** Wadsworth, B.; Lanza, R.; LeVine, M.J.; Scheetz, R.A.; Videbaek, F. (Massachusetts Inst. of Tech., Cambridge (USA). Lab. for Nuclear Science; Brookhaven National Lab., Upton, NY (USA); Argonne National Lab., IL (USA)). 1987. Contract AC02-76CH00016. 5p. (CONF-870552—8). NTIS, PC A02/MF A01; GPO Dep. File Number DE87010444.

From 5. conference on real-time computer applications in nuclear particle and plasma physics; San Francisco, CA, USA (11 May 1987).

A trigger supervisor, implemented in VME-bus hardware, is described, which enables the host computer to dynamically control and monitor the trigger configuration for acquiring data from multiple detector partitions in a complex experiment.

34413 **(BNL—39809) An intelligent VME-based Camac crate controller.** Scheetz, R.A.; LeVine, M.J. (Brookhaven National Lab., Upton, NY (USA)). 1987. Contract AC02-76CH00016. 3p. (CONF-870552—10). NTIS, PC A02/MF A01; GPO Dep. File Number DE87010443.

From 5. conference on real-time computer applications in nuclear particle and plasma physics; San Francisco, CA, USA (11 May 1987).

A VME-resident Camac craft controller is described which maps all Camac functions into the address space of a 68000 microprocessor. The controller also contains a VME bus requester, thus

allowing it to contribute Camac data, completely formatted, to a global event buffer.

34414 **(BNL—39810) A VME-VMX interface to Fastbus via the LeCroy 1821 Segment Manager.** Scheetz, R.A.; LeVine, M.J. (Brookhaven National Lab., Upton, NY (USA)). 1987. Contract AC02-76CH00016. 3p. (CONF-870552—9). NTIS, PC A02/MF A01; GPO Dep. File Number DE87010442.

From 5. conference on real-time computer applications in nuclear particle and plasma physics; San Francisco, CA, USA (11 May 1987).

An interface between multiple LeCroy Segment Managers and a VME-VMX system is described. The host I/O registers of the 1821, and control registers for DMA have been mapped into the short I/O address space of VME. Transfers from the data memory of the 1821 occur via pipelined DMA to the VMXbus. As many as sixteen Segment Managers may be controlled by a single interface.

34415 **(BNL—52036) Future possibilities: Data, hardware, software and people.** Hopper, G.M. (Brookhaven National Lab., Upton, NY (USA)). 1985. Contract AC02-76CH00016. 26p. NTIS, PC A03/MF A01; GPO Dep. File Number DE87010641.

The Model T's of the computer industry are here, and people are beginning to use them. The underlying force, the total flow of information through any organization, must not be neglected. The value of the information must be assessed; it must be analyzed. The possible cost of incorrect information must be addressed. The applications of computers in the Navy are discussed. Publications which were carried out to facilitate this are described. Possible applications of fast computers in the world are considered. Systems of computers must be used. The need for data base machines is pointed out. The history of the construction of COBOL is given. There is great need for positive leadership rather than management. An account is given of the history of the testing of all compilers for the federal government. (DLC)

34416 **(CONF-8706114—1) A framework for selection of expert system tools for IBM PC's.** Carr, K.R. (Martin Marietta Energy Systems, Inc., Oak Ridge, TN (USA)). 1987. Contract AC05-84OR21400. 14p. NTIS, PC A02/MF 01; 1; GPO Dep. File Number DE87007668.

From Annual workshop on robotics and expert systems; Pittsburgh, PA, USA (4 Jun 1987).

The development and execution of expert systems on the popular IBM personal computers (PC's) and compatibles are proliferating rapidly. At least eight or ten comprehensive and powerful expert system development tools software packages are now commercially available for IBM PC's. Also, in this dynamic and highly competitive environment, vendors are working continuously to expand and improve the features and capabilities of their expert system tools products. Therefore, the selection of the most suitable expert system tools for a particular application using IBM PC's must properly address many relevant, rapidly changing factors, and a framework for the selection is needed. This paper provides the needed framework for comparing the various features of the expert system tools for IBM PC's. Technical aspects are considered, such as the hardware configuration required, procedures for generating the knowledge base, knowledge representation method, type of inference engine, and user interface features. Also addressed are factors such as the price of "run-time" versions of an expert system, training available, and user support.

34417 **(DOE/ER—0325) Fastbus standard routines.** (USDOE Office of Energy Research, Washington, DC. Office of High Energy and Nuclear Physics). Mar 1987. 141p. NTIS, PC A07/MF A01; 1; GPO Dep. File Number DE87010331.

This document defines standard routines for software access to a FASTBUS system, a standardized modular high-speed data acquisition and control system defined in ANSI/IEEE Std. 960-1986, published by the Institute of Electrical and Electronic Engineers. It is assumed that the reader is familiar with the FASTBUS system.

34418 **(DOE/ER/25019—1) Resonance in weakly nonlinear systems: Progress report, August 1, 1986-March 31, 1987.** Kevorkian, J. (Washington Univ., Seattle (USA)). 1987. Contract FG06-86ER25019. 3p. NTIS, PC A02/MF A01; GPO Dep. File Number DE87008937.

34419 **(DOE/ER/25026—4) Simulated annealing applied to a problem in combinatorial optimization.** Godman, D.E. (Illinois Univ., Urbana (USA). Dept. of Computer Science). May 1987. Contract FG02-87ER25026. 64p. (UILU-ENG—87-1730; UIUCDCS-R—87-1342). NTIS, PC A04/MF A01; 1; GPO Dep. File Number DE87010571.

This thesis considers the application of simulated annealing to combinatorial optimization problems resulting from a spin glass model of a folding protein. An algorithm is developed which is non-adaptive and executes a number of iterations determined by the problem itself and three parameters: an initial temperature, a final temperature, and a parameter which controls the rate of decrease of the temperature. The number of iterations is fairly insensitive to the initial temperature which can be computed adaptively with little cost. An optimal value for the final temperature can be determined by experimenting with smaller problems. The number of iterations, and, consequently, the solution quality is then determined by the third parameter. The solution quality may be improved somewhat, given a fixed amount of time, by performing several trials and using the best result. In addition, in concurrent environments, this practice may become more advantageous, particularly if a substantial portion of the computations within a trial must be performed sequentially.

34420 **(EPRI-CS/NP—3016-Vol.4B) Modular Modeling System (MMS): Volume 4B, Applications: 1984 code release workshop proceedings.** Bartells, P. (ed.). (Babcock and Wilcox Co., Lynchburg, VA (USA); Electric Power Research Inst., Palo Alto, CA (USA)). Apr 1987. 749p. (CONF-8409396—Vol.4B). Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920392.

From Workshop on Modular Modeling System (MMS); New Orleans, LA, USA (26 Sep 1984).

These proceedings include formal presentations on the following topics: Overview of MMS Code, The MMS Code Enhancements, MMS-02 Development, MMS validation against plant data and codes, MMS validation against Experimental Data, and Utility Applications. Individual papers have been cataloged separately.

34421 (JINR—D-13-85-793, pp 146-150) **On the local computer network organization in IYaF AN KazSSR.** Kuz'minov, A.V.; Tolstikov, V.N. (AN Kazakhskoj SSR, Alma-Ata. Inst. Yadernoj Fiziki). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

Interface structure of on-line measuring centers (OLMC) of large experimental facilities such as reactor, cyclotron, installations for nuclear and electron spectroscopy and radiation material science with the BESM-6/7 central computer is considered. The block-diagram of intermachine communication system of cyclotron OLMC comprising three hierarchial levels is described in detail. The upper level (the SM-4 computer) exercises mathematical data processing during the experiment; experimental data filing; service of the communication channel with the central computer, program editing and check-out. Experiment control in the conversational regime, preliminary data processing and service are carried out by means of medium level computer such as the "Elektronika-60", the SM-3, the SM-4. The lower level of the system is intended for experimental data real time acquisition sorting and accumulation. Intermachine communications are realized by telegraph channels via interface CAMAC moduli permitting to conduct data transceiving in the logical code in an asynchronous regime.

34422 (JINR—D-13-85-793, pp 255-257) **INTER-80 graphic terminal.** Alekseeva, N.P.; Kirilov, A.S.; Levchanovskij, F.V.; Nikul'skij, A.V.; Prikhod'ko, V.I.; Yazvitskij, N.Yu. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

INTER-80 graphics terminal comprising an indicator on the storage bistable electron-beam tube 31LNCh, the display processor on microcircuits of KR580 series, the keyboard and the trackball is described. Microsoftware of the terminal has modular structure. Each module realizes one of independent processes general control of which is exercised by the monitor module. A scheme of conveyor processing is chosen for parallel data receiving and processing. The INTER-80 is connected to the SM-4 computer via an asynchronous series interface of DL-11 type and program-connected with the ATOM graphic batch.

34423 (JINR—D-13-85-793, pp 159-163) **EhLEKTRONIKA-60 computer software for operation with microprocessors.** Semenov, Yu.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

A translator for AMDASM assembler and the FORTH interpretive programming fourth generation system intended for operating with sectional microprocessors are described. AMDASM permits to load translated and linked literal of the microprogram into a mass or fixed memory of any configuration. FORTH is used as the basic diagnostics language for FASTBUS equipment.

34424 (JINR—D-13-85-793, pp 164-166) **Software complex for developing dynamically packed program system for experiment automation.** Baluka, G.; Salamatin, I.M. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

Software complex for developing dynamically packed program system for experiment automation is considered. The complex includes general-purpose programming systems represented as the RT-11 standard operating system and specially developed problem-oriented moduli providing execution of certain jobs. The described complex is realized in the PASCAL' and MACRO-2 languages and it is rather flexible to variations of the technique of the experiment.

34425 (JINR—D-13-85-793, pp 167-170) **Use of the PASKAL' language for programming in experiment automation systems.** Ostrovnoj, A.I. 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

A complex of standard solutions intended for realization of the main functions is suggested; execution of these solutions is provided by any system for experiment automation. They include: recording and accumulation of experimental data; visualization and preliminary processing of incoming data, interaction with the operator and system control; data filing. It is advisable to use standard software, to represent data processing algorithms as parallel processes, to apply the PASCAL' language for programming. Programming using CAMAC equipment is provided by complex of procedures similar to the set of subprograms in the FORTRAN language. Utilization of a simple data file in accumulation and processing programs ensures unified representation of experimental data and uniform access to them on behalf of a large number of programs operating both on-line and off-line regimes. The suggested approach is realized when developing systems on the base of the SM-3, SM-4 and MERA-60 computers with RAFOS operating system.

34426 (JINR—D-13-85-793, pp 171-175) **Recursion organization of interactive experiment control systems in distributed multi-level automated systems for scientific investigations.** Putilov, V.A. (AN SSSR, Irkutsk. Sibirskij Inst. Zemnogo Magnetizma Ionosfery i Rasprostraneniya Radiovoln). 1985. (In Russian). NTIS (US Sales Only), PC A20/MF A01. File Number DE87780145. (CONF-8507152—).

From 12. international symposium on nuclear electronics; Dubna, USSR (2 Jul 1985).

Problems of organization of multilevel distributed systems for complex investigations of different objects, phenomena and processes are discussed. Priori uncertainty of organization procedures of these investigations assumes compulsory presence of interactive means of communication of an investigator with the system at all the levels of solving complex problems. Recurrent models which assume detailed representation of the solved problem using decomposition tree of research purposes should be used as formal apparatus when developing the considered systems. Recurrent derivation of an algorithm of the problem solution is exercised using the problem-oriented LEADER language.

34427 **(JINR-E—10-86-430) Program FEDEF for the parametrization of experimental data.** Kozma, P.; Kozmova, J.; Hnatowicz, V.; Streit, E. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1986. 4p. NTIS (US Sales Only), PC A02/MF A01. File Number DE87702339.

The FEDEF program provides the parametrization of experimental data with theoretical functions by the least-squares-fit method. A set of about 100 data points and 10 fitting parameters can be simultaneously treated. The FEDEF program can be adapted for use with programs where parameters may be changed to improve an agreement between calculated predictions and experimental data. 7 references, 2 figures.

34428 **(LA-UR—87-1825) The Los Alamos Neutron Scattering Center data acquisition system.** Nelson, R.O.; Cort, G.; Gjovig, A.; Goldstone, J.A.; McMillan, D.E.; Ross, J.; Seal, J.; Machen, D.R. (Los Alamos National Lab., NM (USA); Scientific Systems International, Los Alamos, NM (USA)). 20 May 1987. Contract W-7405-ENG-36. 20p. (CONF-870552—5). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010140.

From 5. conference on real-time computer applications in nuclear particle and plasma physics; San Francisco, CA, USA (11 May 1987).

The FASTBUS subsystem of the LANSCE data acquisition system consists of a single FASTBUS crate segment with four custom modules and a QPI interface for the VAX. Since experiments at the LANSCE facility always include a time-of-flight parameter for the detected neutron and may optionally include additional position parameters characterizing the event, a time stamp is generated for each event by the Programmable Master Clock (PMC) module. The time and any position information are latched into the Time-Of-Flight buffer (TOF) module. After all events associated with a single neutron burst have been captured in a frame buffer internal to the TOF module, each event is analyzed by the MAPPER module and reduced to a histogram address to increment in the BULKSTORE module. Software access to the histogram is provided through the QPI interface.

34429 **(NEANDC(E)—231-L) OSIRIS: a Runge Kutta solver of systems of ordinary differential equations.** Collin, M.; Schett, A. (CEA Centre d'Etudes de Bruyeres-le-Chatel, 92 - Montrouge (France)). Dec 1983. 69p. (INDC(FR)—61-L). NTIS (US Sales Only), PC A04/MF A01. File Number DE87751807.

The Code OSIRIS (Order and Step Idently Adjusting Runge-Kutta Integrator of Systems) has been developed on the basis of both explicit as well as implicit Runge-Kutta processes of various orders: 4(5), 7(8), 8(9), 10 for explicit processes and 4 and 6 for implicit processes of the Rosenbrock type. This permits an optimization of the integration procedure by choosing the appropriate type of Runge-Kutta methods (explicit or implicit) and by adjusting dynamically the order of the process as well as the step-size. The

performance of the Code OSIRIS is demonstrated by some representative examples and is compared with the Code GEAR which is applying multistep methods.

34430 **(NUREG/CR—4800) SIGPI: A user's manual for fast computation of the probabilistic performance of complex systems.** Patenaude, C.J. (Lawrence Livermore National Lab., CA (USA); Nuclear Regulatory Commission, Washington, DC (USA). Div. of Reactor Systems Safety). May 1987. Contract W-7405-ENG-48. 71p. (UCID—20679). NTIS, PC A04/MF A01 - GPO. File Number TI87010002.

The SIGPI program computes the probability of complex systems as defined by cut sets or other binary product sets. The SIGPI program uses two fast complementary methods of computing the probabilistic performance of complex systems: the II method and the Σ method. The II algorithm exploits the fact that carefully defined system components are often statistically independent conditional to the environment in which they are embedded. The Σ algorithm computes the probability of combinations of components produced by the II algorithm by disjointing and partitioning such components, thereby allowing the exact computation of performance. The program assumes input of up to three data types: cut set data in disjoint normal form, basic component probabilities for independent basic components, and/or mean and covariance data for statistically dependent basic components.

34431 **(ORNL/DSRD/TM—2) Recommendation on expert systems application for troubleshooting support of specific Navy minicomputer operations.** Carr, K.R. (Oak Ridge National Lab., TN (USA). Data Systems Research and Development Program). Apr 1987. Contract AC05-84OR21400. 33p. NTIS, PC A03/MF A01; 1; GPO Dep. File Number DE87010143.

A study was performed and specific recommendations were developed for the application of expert systems to enhance a hotline troubleshooting operation, Trouble Desk, of the US Navy. The Trouble Desk service functions continuously and now receives a call for assistance on an average of about every 1-1/2-hours, around the clock, in support of 300 minicomputer sites; eventually, there will be over 600 minicomputer sites. To determine the advisability and cost/benefit of an expert system in this potential application, the study included the development of an expert system and accompanying equipment (with simulated component faults) for demonstration and evaluation, discussions with Navy personnel and workers in this technical field, and a review of several candidate hardware and software choices. General guidelines for the decision to implement an expert system for equipment troubleshooting in various projects were developed and are included in this report.

34432 **(SAND—86-1922) Multi users guide.** Ballard, W.P. (Sandia National Labs., Albuquerque, NM (USA)). Apr 1987. Contract AC04-76DP00789. 199p. NTIS, PC A09/MF A01; 1; GPO Dep. File Number DE87010526.

MULTI is a pseudo-operating system for data acquisition written in Tektronix SPS BASIC. It controls any mix of Tektronix 7912AD and 7612D transient digitizers. Transient digitizers are used to acquire data in a number of fields such as pulsed power, laser research, and electro-magnetic pulse testing where the repetition rates are so low that sampling techniques are not useful. Also, the entire pulse may contain important data which vary from event to event. MULTI allows real-time sharing of digitizers among several single-shot accelerators using a programmable switch matrix. MULTI was designed to acquire large amounts of data from moderate to high pulse rate accelerators (up to 50 pulses per day) in a shared environment. Hence, only data acquisition, storage on disk, and plotting are built into the program. However, user-written special processing routines may be executed for each shot at run time if desired. Also, extensive post-processing capability is built-in which allows the same routine to be executed for a sequence of consecutive shots without operator intervention. Data may also be acquired in burst mode. However, burst mode only operates one 7912AD digitizer per pulse and only one accelerator at a time. It has been successfully operated up to 100 pulses at 1 Hz. In single-shot mode, two accelerators have successfully shared the system switching from one to the other randomly.

34433 **(SAND—87-0185) An improved treatment of radiation energy flow in the radiation-hydrodynamics code CHARTD.** Rottler, J.S. (Sandia National Labs., Albuquerque, NM (USA)). May 1987. Contract AC04-76DP00789. 47p. NTIS, PC A03/MF A01; GPO Dep. File Number DE87010625.

An improved treatment of radiation transport has been added to the energy flow model in CHARTD. The new energy flow model was derived based on the assumption that the directional dependence of the radiation energy density can be represented by the first two terms of a spherical harmonic expansion, and that the photon energy spectrum can be partitioned into energy groups. This treatment of radiation transport is called the multigroup P-1 approximation, and is an effective description of radiation transport for a broad class of radiation-hydrodynamics problems. A synthetic acceleration scheme is used to solve the differenced multigroup P-1 equations. The coupling between the material field and the radiation field is fully explicit. This report describes the new energy flow model and the acceleration scheme used to solve the difference equations. 15 refs.

34434 **(SAND—87-0364C) SandKASt [Sandia Knowledge Acquisition System]: An automated knowledge acquisition system.** Hill, F.N.; Ward, J.D.; Yates, A.L. (Sandia National Labs., Albuquerque, NM (USA)). 9 Feb 1987. Contract AC04-76DP00789. 14p. (CONF-870734—1). NTIS, PC A02. File Number DE87006127.

From American Association for Artificial Intelligence meeting; Seattle, WA, USA (13 Jul 1987).

SandKASt (Sandia Knowledge Acquisition System) is a knowledge acquisition system that allows the expert to directly build a knowledge base. It is based on a graph formalism that delineates the problem structure and dependencies of the heuristics and highlights in consistencies or omissions in the knowledge base. The graph formalism evolved through our experience in developing a rule-based system for fault diagnosis of electronic components in a large system. In SandKASt, the knowledge base is displayed as a directed acyclic graph. In this graph, a node represents a state of the troubleshooting session, or context, with an associated set of possible faults. An arc represents a test to be applied in the context of the source node. The graph can be expanded depth-first, breadth-first or by adding a single node. Graph pruning and information retrieval can be performed at any time during the knowledge acquisition session. With the development of SandKASt, we sought to involve the expert directly in the system development and maintenance. We find that SandKASt allows more efficient and productive knowledge acquisition sessions. The graph structure provides a formalism for viewing the knowledge acquisition process and allows efficient storage of the diagnostic heuristics without redundancy.

34435 **(SAND—87-0872) Simnple, portable, 3-D projection routine.** Wagner, J.S. (Sandia National Labs., Albuquerque, NM (USA)). Apr 1987. Contract AC04-76DP00789. 21p. NTIS, PC A02/MF A01; GPO Dep. File Number DE87010537.

A 3-D projection routine is presented for use in computer graphics applications. The routine is simple enough to be considered portable, and easily modified for special problems. There is often the need to draw three-dimensional objects on a two-dimensional plotting surface. For the object to appear realistic, perspective effects must be included that allow near objects to appear larger than distant objects. Several 3-D projection routines are commercially available, but they are proprietary, not portable, and not easily changed by the user. Most are restricted to surfaces that are functions of two variables. This makes them unsuitable for viewing physical objects such as accelerator prototypes or propagating beams. This report develops a very simple algorithm for 3-D projections; the core routine is only 39 FORTRAN lines long. It can be easily modified for special problems. Software dependent calls are confined to simple drivers that can be exchanged when different plotting software packages are used.

34436 (SLAC—309) Nonparametric conditional estimation. Owen, A.B. (Stanford Linear Accelerator Center, Menlo Park, CA (USA)). Jan 1987. Contract AC03-76SF00515. 56p. NTIS, PC A04. File Number DE87010324.

Many nonparametric regression techniques (such as kernels, nearest neighbors, and smoothing splines) estimate the conditional mean of Y given X = chi by a weighted sum of observed Y values, where observations with X values near chi tend to have larger weights. In this report the weights are taken to represent a finite signed measure on the space of Y values. This measure is studied as an estimate of the conditional distribution of Y given X = chi. From estimates of the conditional distribution, estimates of conditional means, standard deviations, quantiles and other statistical functionals may be computed. Chapter 1 illustrates the computation of conditional quantiles and conditional survival probabilities on the Stanford Heart Transplant data. Chapter 2 contains a survey of nonparametric regression methods and introduces statistical metrics and von Mises' method for later use. Chapter 3 proves some consistency results. Chapter 4 provides conditions under which the suitably normalized errors in estimating the conditional distribution of Y have a Brownian limit. Using von Mises' method, asymptotic normality is obtained for nonparametric conditional estimates of compactly differentiable statistical functionals.

34437 (UCID—21011-Vol.4) Software design document for DOEDEF Translator Module Pool A. Wimple, C. (Lawrence Livermore National Lab., CA (USA)). 21 Apr 1987. Contract W-7405-ENG-48. 161p. NTIS, PC A08/MF A01; 1; GPO Dep. File Number DE87010691.

The Department of Energy Data Exchange Format (DOEDEF) Translator Module Pool A (hereafter referred to as the "pool") is intended to reduce the manpower required to rewrite the DOEDEF translator software already in existence throughout the Department of Energy Nuclear Weapons Complex (DOE NWC). Each portion of the DOEDEF exchange system and therefore each site's DOEDEF translator software must be rewritten during the transition from Phase 1.0 to Phase 1.5 of DOEDEF. By providing a pool, the effort required to move from Phase 1.0 to Phase 1.5 can be reduced throughout the NWC.

34438 (UCID—21058) The hybrid compiler writing system. Kuczmarski, T.A. (Lawrence Livermore National Lab., CA (USA)). May 1987. Contract W-7405-ENG-48. 166p. NTIS, PC A08/MF A01; GPO Dep. File Number DE87010621.

A set of compiler writing tools has been developed at the Lawrence Livermore National Laboratory which greatly facilitates the implementation of production quality compilers for a variety of languages. The tools are based on the optimization, code generation, and code scheduling portions of a highly optimizing, mature, preexisting Fortran compiler. The system is called the hybrid compiler writing system.

34439 (UCRL—95331) Some aspects of the present status of future directions of computational electromagnets. Miller, E.K.; Deadrick, F.J. (Kansas Univ., Lawrence (USA); Lawrence Livermore National Lab., CA (USA)). 1986. Contract W-7405-ENG-48. 19p. (CONF-8611158—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010278.

From JINA '86: Institute for Electrical and Electronics Engineers meeting; Nice, France (4 Nov 1986).

The continuing growth of computing resources is changing how we think about, formulate, solve, and interpret problems. We attempt in this paper to develop some perspective concerning the spectrum of computational resources now available and anticipated future developments relative to their application in computational electromagnetics (CEM). This task has the two aspects of characterizing the spectrum of computers available, which range from the personal computer (PC) to Cray-class supercomputers and similarly characterizing the computing software needed to model real-world EM problems.

34440 (UCRL—95910-Rev.1) Bidirectional reflection functions from surface bump maps. Cabral, B.; Max, N.; Springmeyer, R. (California Univ., Davis (USA); Lawrence Livermore National Lab., CA (USA)). 29 Apr 1987. Contract W-7405-ENG-48. 11p. (CONF-870738—2-Rev.1). NTIS, PC A02. File Number DE87009618.

From ACM SIGGRAPH conference; Anaheim, CA, USA (27 Jul 1987).

The Torrance-Sparrow model for calculating bidirectional reflection functions contains a geometrical attenuation factor to account for shadowing and occlusions in a hypothetical distribution of grooves on a rough surface. Using an efficient table-based method for determining the shadows and occlusions, we calculate the geometric attenuation factor for surfaces defined by a specific table of bump heights. Diffuse and glossy specular reflection of the environment can be handled in a unified manner by using an integral of the bidirectional reflection function times the environmental illumination, over the hemisphere of solid angle above a surface. We present a method of estimating the integral, by expanding the bidirectional reflection coefficient in spherical harmonics, and show how the coefficients in this expansion can be determined efficiently by reorganizing our geometric attenuation calculation.

34441 (UCRL—95935) Colorad system for mapping elemental composition determined by x-ray analysis. McCoy, D.D. (Lawrence Livermore National Lab., CA (USA)). Mar 1987. Contract W-7405-ENG-48. 7p. (CONF-870725—7). NTIS, PC A02/MF A01; GPO Dep. File Number DE87008472.

From 22. annual meeting of the Microbeam Analysis Society; Kailua-Kona, HI, USA (13 Jul 1987).

Colorad is a color-imaging system that maps concentrations and phase distributions of elements in a designated region of a material by analysis of x-ray signals generated in the material by a scanning electron beam. Color variations show the amounts of different elements present and the composition of the phases. The instrument measures the intensity of each element's characteristic x-ray signal, then assigns a lightness to represent the concentration of a selected element, and a color (characterized by hue, value, and chroma) for a given combination of elements. The color display is unambiguously associated with concentration levels, permitting elemental analysis of concentrations as low as 0.5%. Because the brightness of the image is independent of signal strength, the instrument is particularly valuable for determining the composition of phases present. A typical use of Colorad is in analyzing the material in the vicinity of a braze joint to determine the quality of the braze.

34442 (UCRL—95948) The Shadow Mask Sweep family of shadow algorithms. Grant, C.W. (California Univ., Davis (USA); Lawrence Livermore National Lab., CA (USA)). 13 Jan 1987. Contract W-7405-ENG-48. 29p. (CONF-870738—1). NTIS, PC A03. File Number DE87007054.

From ACM SIGGRAPH conference; Anaheim, CA, USA (27 Jul 1987).

The Shadow Mask Sweep (SMS) family of algorithms is a new image synthesis technique for generating shadows. The SMS technique is based on the painter's algorithm for visible surface determination. The antialiased version of the painter's algorithm is based on antialiased digital raster compositing techniques. These compositing techniques have previously assumed that the edges of the objects represented in the rasters were uncorrelated. This causes problems compositing objects modeled with primitives with correlated edges. These objects are common in image synthesis, such as meshes of polygons. It was desired to produce a shadow algorithm that could handle both primitives with correlated and uncorrelated edges in the same image. To do this it was necessary to develop new compositing techniques. A new technique for correlated edges is combined with an extension of the existing uncorrelated edge technique producing a system that can use both. The painter's algorithm is extended to correct operation with both types of primitives using these new compositing techniques. Applying the painter's algorithm simultaneously to both visible surface and shadow determination yields the SMS technique. Algorithms based on the SMS technique are suitable for all opaque "sharp edged" primitives than can be rendered with the painter's algorithm and all opaque or transparent "fuzzy" primitives that can be rendered with

the painter's algorithm. Primitives and combinations of primitives which previously had no efficient, general shadow algorithms, such as particle systems and nonuniform density translucent volumes can now be rendered efficiently using the SMS technique.

34443 **(UCRL—96151) A simple and efficient interprocess communication system for actually using a laboratory computer network.** Preckshot, G.G.; Butner, D.N. (Lawrence Livermore National Lab., CA (USA)). 1987. Contract W-7405-ENG-48. 8p. (CONF-870552—4). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010272.

From 5. conference on real-time computer applications in nuclear particle and plasma physics; San Francisco, CA, USA (11 May 1987).

An interprocess communication system (IPCS) is being developed at Lawrence Livermore National Laboratory to support a network of computers which do data acquisition and data processing for fusion experiments. The IPCS permits us to improve system performance by allowing us to move programs to different CPUs for increased efficiency or to add more CPUs for more parallel operation. We discuss motivations, architecture, implementation, usage and results of our experience with the IPCS.

34444 **(UCRL—96628) Praxis: An alternative to Ada?.** Holloway, F.W.; Sherman, T.A. (Lawrence Livermore National Lab., CA (USA)). 13 May 1987. Contract W-7405-ENG-48. 11p. (CONF-870552—7). NTIS, PC A02/MF01; 1; GPO Dep. File Number DE87009943.

From 5. conference on real-time computer applications in nuclear particle and plasma physics; San Francisco, CA, USA (11 May 1987).

This report describes Praxis, a modern, complete, block structures, strongly typed, programming language, comparable to Ada, and with special emphasis toward meeting systems programming requirements on all level machines. Praxis is considered as a possible alternative to Ada in certain applications. Praxis has been used since 1980 on the distributed control system for the Nova high energy laser at Lawrence Livermore National Laboratory. A description of the intended applications, the history of development, and an overview of the features of the language with comparisons to the Pascal and Ada languages, are given. The features are described in four categories: general appearance, power, insurance of freedom from errors, and manageability.

34445 **(EPRI-NP—4574-CCM-Pt.2-Ch.6-Vol.3) ARMP-02 documentation: Part 2, Chapter 6: CPM-2 computer code manual: Volume 3, Programmer's manual.** Jones, D.B. (Levy (S.), Inc., Campbell, CA (USA); Electric Power Research Inst., Palo Alto, CA (USA)). Apr 1987. 639p. Research Reports Center, Box 50490, Palo Alto, CA 94303. File Number TI87920399.

CPM-2 is a lattice physics computer code which employs two-dimensional, multigroup neutron transport equations to solve for detailed neutron flux distributions and eigenvalues in fuel assembly designs typical of light water reactors. CPM-2 employs a special predictor-corrector methodology for calculating the burnup of fuel isotopics. CPM-2 combines the rigorous theory of collision probabilities, simple input and enhanced Restart/Data file management capabilities to form an accurate, production-oriented tool for the analysis of nuclear fuel assemblies. CPM-2 is a single-source computer code written entirely in FORTRAN and is available in CDC and IBM versions.

34446 **Conformal mapping of circular arc polygons.** Bjorstad, P.; Grosse, E. (Dept. of Computer Science, Univ. of Bergen, N-5000 Bergen). *SIAM Journal on Scientific and Statistical Computing;* **8**: No. 1, 19-32(Jan 1987).

An algorithm is described which computes the conformal mapping from the unit disk onto an arbitrary polygon having circular arcs as sides. This generalizes the Schwarz-Christoffel program. The algorithm must also determine certain parameters by solving a nonlinear least squares problem. Instead of using Gauss-Jacobi quadrature to evaluate the Schwarz-Christoffel integral, however, an ordinary differential equation solver is applied to a non-singular formulation of the Schwarzian differential equation. The construction of a conformal mapping reduces simple elliptic partial differential equations on an irregular region to similar problems on a disk, for which existing programs can compute solutions very efficiently. Typical examples arise in the modeling of conductivity past an array of conducting cylinders and electrical fields inside a waveguide.

34447 **The design of a self managing secondary memory.** Rathi, B.D.; Browne, J.C.; Lipovski, G.J. (IBM T.J. Watson Research Center, Yorktown Heights, NY 10598). pp 292-301 of Proceedings of the twentieth Hawaii international conference on system sciences. Stohr, E.A.; Hoevel, L.; Haynes, L.; Chu, Y.; Speckhard, A. Honolulu, HI 96743; Hawaii Int'l Conference on System Sciences (1987). (CONF-870108—).

From 20. annual Hawaii international conference on system sciences; Honolulu, HI, USA (6 Jan 1987).

The "self-managing-secondary memory" (SMSM) is intended to serve at an intermediate level between primary memory and disks in the memory hierarchy. It supports name based associative searching for objects, to implement distributed and parallel name (directory) management. It also supports hardware memory allocation, garbage collection and compaction. It can store and retrieve variable size objects as readily as fixed size objects. The SMSM is modularly expandable in two senses: multiple units can function as an integrated unit with respect to name management; and (due to internal parallelism) the storage capacity of each cell can be expanded over a wide range without increase in latency or access times. The functionality of the SMSM can be extended to include database operations such as selection or projection if desired. These unique properties make the SMSM an attractive design element for multi-processor architectures and for object-oriented memory systems.

34448 **Approximate and exact parallel scheduling with applications to list, tree and graph problems.** Cole, R.; Vishkin, U. pp 478-491 of Proceedings of the 27th annual symposium on foundations of computer science. Piscataway, NJ; IEEE Service Center (1986). (CONF-8610254—).

From 27. annual symposium on foundations of computer sciences; Toronto, Canada (27 Oct 1986).

The authors study two parallel scheduling problems and their use in designing parallel algorithms. First, they define a novel scheduling problem; it is solved by repeated, rapid, approximate reschedulings. This leads to a first optimal PRAM algorithm for list ranking, which runs in logarithmic time. The second scheduling results is for computing prefix sums of logn bit numbers. The authors given an optimal parallel algorithm for the problem which runs in sublogarithmic time. These two scheduling results together lead to logarithmic time PRAM algorithms for the connectivity, biconnectivity and minimum spanning tree problems. The connectivity and biconnectivity algorithms are optimal unless m = o(nlog/sup ./n), in graphs of n vertices and m edges.

34449 **Algorithm for singular value decomposition.** Ross, D.C. (Los Alamos National Lab., NM). *Proceedings of the Society of Photo-Optical Instrumentation Engineers;* **495**: 22-29(1984). (CONF-840872—).

From SPIE annual technical symposium; San Diego, CA, USA (19 Aug 1984).

An iterative algorithm for the singular value decomposition (SVD) of a non-zero m x n matrix M is described and illustrated numerically. Derivations of the algorithm and sufficient conditions for convergence are outlined. 2 references, 2 figures, 1 table.

9903 Information Handling

REFER ALSO TO CITATION(S) 32526, 32994, 33021, 33766, 34403

34450 **(LA-UR—87-1791) How much sequence data will the data banks be processing in the near future?.** Burks, C. (Los Alamos National Lab., NM (USA)). 1987. Contract W-7405-ENG-36. 16p. (CONF-8705105—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010138.

From 1. CODATA workshop on nucleic acid and protein sequencing data; Gaithersburg, MD, USA (3 May 1987).

It is widely recognized that the large-scale nucleotide sequence data banks have had a difficult time keeping abreast of the immense volume (and associated complexity) of sequence data over the past five years. Concern over this problem is compounded by the general predictions that have circulated suggesting that there will be an even greater flood of data in the near future. We present a brief picture of the time-course of appearance of nucleotide sequence data over the past 15 years based on information drawn from the GenBank database, and then use several alternative prediction models to project quantitatively the growth of sequence data over the period 1988-2005.

34451 **(SAND—84-1643-Rev.) Version II of the users manual for the Tuff Data Base Interface.** Welch, E.P.; Satter, B.J.; Langkopf, B.S.; Zeuch, D.H. (Sandia National Labs., Albuquerque, NM (USA)). May 1987. Contract AC04-76DP00789. 127p. NTIS, PC A07/MF A01; 1; GPO Dep. File Number DE87010520.

The Nevada Nuclear Waste Storage Investigations (NNWSI) Project, managed by the Nevada Operations Office of the US Department of Energy, is investigating the feasibility of locating a repository at Yucca Mountain on and adjacent to the Nevada Test Site (NTS) in southern Nevada. A part of this investigation includes obtaining physical properties from laboratory tests on samples from Yucca Mountain and from field tests at Yucca Mountain. A computerized data base has been developed to store this data in a centralized location. The data base is stored on the Cyber 170/855 computer at Sandia using the System 2000 Data Base Management software. A user-friendly interface, the Tuff Data Base Interface (the Interface), allows NNWSI participants to retrieve data from the Tuff Data Base. The Interface gives users flexibility to retrieve portions of the Data Base related to their interests. This report gives basic instructions on accessing the Sandia computing system and explains how to use the Interface. 18 figs., 5 tabs.

34452 **(UCRL—93125) The Intelligent Gateway: A dynamic resource environment.** Burton, H.D. (Lawrence Livermore National Lab., CA (USA)). Jul 1985. Contract W-7405-ENG-48. 6p. (CONF-8512127—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87008744.

From 9. international online information meeting; London, UK (3 Dec 1985).

The concept of gateways and front-ends as a means to facilitate access to the growing multiplicity of computer based resources is becoming increasingly popular. But the design philosophy and implementation of most of these interfaces constrain the user to a predefined, limited set of resources. For example, some front-ends facilitate searching certain databases while others may handle more databases, but only via certain vendors. The TIS Intelligent Gateway, developed at the Lawrence Livermore National Laboratory, has eliminated such constraints on users by incorporating an extensible meta-machine approach to accommodate unlimited target resources and by providing a universal-user interface to simplify communication between the user and target resource. Target resources can be located externally to the gateway or installed on the gateway processor; resources can be access services (e.g., Pro-Search, Easynet, Scimate), database systems (full text, bibliographic, numeric, or otherwise), or processing tools (statistical analysis, editing, word processing, trend analysis, etc.). The user has access to that combination of tools and data sources which satisfies his idiosyncratic information needs. As those needs change over time, or new users join the system, resources can be added dynamically without any interruption of ongoing operations. The development and implementation of this dynamic approach to resource provision are detailed in this paper.

34453 **(UCRL—96222) The effect of data structures on INGRES performance.** Creighton, J.R. (Lawrence Livermore National Lab., CA (USA)). 1987. Contract W-7405-ENG-48. 25p. (CONF-8704121—1). NTIS, PC A02/MF A01; 1; GPO Dep. File Number DE87010269.

From Ingres User Association meeting; San Francisco, CA, USA (26 Apr 1987).

Computer experiments were conducted to determine the effect of using Heap, ISAM, Hash and B-tree data structures for INGRES relations. Average times for retrieve, append and update were determined for searches by unique key and non-key data. The experiments were conducted on relations of approximately 1000 tuples of 332 byte width. Multiple operations were performed, where appropriate, to obtain average times. Simple models of the data structures are presented and shown to be consistent with experimental results. The models can be used to predict performance, and to select the appropriate data structure for various applications.

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Maywood Interim Storage Site: Annual site environmental report, Maywood, New Jersey, Calendar year 1986: Formerly Utilized Sites Remedial Action Program, 12:32587 (R;US)
Middlesex Sampling Plant and Middlesex Municipal Landfill annual site environmental report, Middlesex, New Jersey: Calendar year 1986, 12:32588 (R;US)
Niagara Falls Storage Site, Annual site environmental report, Lewiston, New York, Calendar year 1986: Surplus Facilities Management Program (SFMP), 12:32532 (R;US)

Bechtel National, Inc., San Francisco, CA (USA)
Magnetically confined kinetic-energy storage ring using attractive levitation, 12:33016 (R;US)

Bern Univ. (Switzerland). Lab. fuer Radiochemie
Beryllium-10: Half-life and AMS-standards, 12:34162 (R;US)

Bhabha Atomic Research Centre, Bombay (India). Technical Physics and Prototype Engineering Div.
Growth and characterization of $LiNbO_3$ crystals, 12:33194 (R;IN)
Preparation of mercury cadmium telluride an infrared detector material, 12:33195 (R;IN)

Bolt (Robert O.), San Rafael, CA (USA)
Lubrication guide: Final report, 12:33128 (R;US)

Bonneville Power Administration, Portland, OR (USA)
Review of current literature and research on gas supersaturation and gas bubble trauma: Special publication Number 1, 12:33864 (R;US)

Bonn Univ. (Germany, F.R.)
Comparative investigations on the transferability of results from standardized vessel and lysimeter experiments on the actual field conditions with the example of the residue situation in plants after spraying with Goltix and Tribunil, 12:33892 (R;DE;In German)
International nuclear fuel cycle evaluation (INFCE). An attempt on consensus in international nuclear policy, 12:33031 (R;DE;In German)

Booz, Allen and Hamilton, Inc., Bethesda, MD (USA)
Customer preference and behavior: Residential modeling framework: Final report, 12:33039 (R;US)

British Columbia Univ., Vancouver (Canada). Dept. of Zoology
Review of current literature and research on gas supersaturation and gas bubble trauma: Special publication Number 1, 12:33864 (R;US)

Brookhaven National Lab., Upton, NY (USA)
A VME-VMX interface to Fastbus via the LeCroy 1821 Segment Manager, 12:34414 (R;US)
An advanced residential heat pump using the supercharged cycle: Volume 1: Final report, 12:33071 (R;US)
An advanced residential heat pump using the supercharged cycle: Volume 2, Appendix 9, Machine drawings and photographs: Final report, 12:33072 (R;US)
An intelligent VME-based Camac crate controller, 12:34413 (R;US)
Coal pretreatment with carbon dioxide and water: Effects on North Dakota lignite and Utah coal: Final report, 12:32458 (R;US)
Design of pole assignment using m-order compensators, 12:34409 (R;US)
Development of a computerized data base for low-level radioactive waste leaching data: Topical report, 12:32526 (R;US)
Distributed data acquisition for BNL802 I: The front end, 12:34410 (R;US)
Distributed data acquisition for BNL802 II: Software, 12:34411 (R;US)
Environmental effects of radiation emergencies, 12:33022 (R;US)
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Potential health and safety hazards associated with the production of gallium arsenide alloy based multi-junction photovoltaic cells, 12:32621 (R;US)
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Shell model calculations of /sup 90,88/Zr and /sup 90,88/Y, 12:34201 (R;US)
Sub-surface defects studied by variable energy positrons, 12:34225 (R;US)
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The AGS-Booster lattice, 12:33510 (R;US)
The trigger supervisor: Managing triggering conditions in a high energy physics experiment, 12:34412 (R;US)
Thermal-hydraulic studies on molten core-concrete interactions, 12:32891 (R;US)

Brown County Planning Commission, Green Bay, WI (USA)
Green Bay transit cost-allocation study for the Green Bay urbanized area. Final report, 12:33126 (R;US)

Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)
Application of HOLOSAFT for nondestructive testing of reactor components. Final report, 12:32835 (R;DE;In German)

Bureau of Mines, Fairbanks, AK (USA). Alaska Field Operations Center
Uranium occurrences in the northern Darby Mountains, Seward Peninsula, Alaska. Information circular, 12:32504 (R;US)

C

Caen Univ., 14 (France). Lab. de Physique Corpusculaire
Heavy ion induced fusion between 10 and 100 MeV/u, 12:34157 (R;FR)

California Univ., Berkeley (USA)
High-frequency observations of impact site noise near RSON: implications for the discrimination of ripple-fired mining blasts, 12:33649 (R;US)

California Univ., Berkeley (USA). Kearney Plant and Soil Biology
Control of water infiltration into near surface LLW [low level waste] disposal units: Annual report, October 1985-September 1986, 12:32573 (R;US)

California Univ., Davis (USA)
Bidirectional reflection functions from surface bump maps, 12:34440 (R;US)
The Shadow Mask Sweep family of hidden algorithms, 12:34442 (R;US)

California Univ., Davis (USA). Dept. of Applied Science
Microwave production from a plasma driven by a high power relativistic electron beam, 12:34046 (R;US)

California Univ., Davis (USA). Human Performance Lab.
Physiological responses of healthy human subjects consequent to inhalation of NO_x, O_3, and NO_x plus O_3 during heavy, sustained exercise. Final report, 9 November 1984-9 November 1986, 12:33949 (R;US)

California Univ., Los Angeles (USA). Dept. of Radiological Sciences
On the convergence of the maximum likelihood-estimator method of tomographic image reconstruction, 12:33859 (R;US)

California Univ., San Diego (USA)
Limit on anti ν/sub e/ mass from the molecular tritium beta decay, 12:34087 (R;US)

California Univ., Santa Barbara (USA)
Charm photoproduction results from the Fermilab Tagged Photon Spectrometer, 12:34076 (R;US)

Canterbury Univ., Christchurch (New Zealand). Dept. of Chemical and Process Engineering
Indirect energy of New Zealand transport, 1969-1978: An energy analysis of imports and exports, 12:32607 (R;NZ)

Carleton Univ., Ottawa, Ontario (Canada)
Charm photoproduction results from the Fermilab Tagged Photon Spectrometer, 12:34076 (R;US)

Carnegie-Mellon Univ., Pittsburgh, PA (USA). Dept. of Physics
Strange particle physics - today and tomorrow: Conference summary, 12:34075 (R;US)
The weak decay of lambda hypernuclei, 12:34074 (R;US)

Case Western Reserve Univ., Cleveland, OH (USA). Dept. of Radiology
Ionization in liquids: Progress report, November 1, 1984-October 31, 1987, 12:33944 (R;US)

Cawthron Inst., Nelson (New Zealand)
Biological production of methane from Southland lignite: A literature survey: Final report, 12:32608 (R;NZ)

CEA Centre d'Etudes de Bruyeres-le-Chatel, 92 - Montrouge (France)
OSIRIS: a Runge Kutta solver of systems of ordinary differential equations, 12:34429 (R;FR)

CEA Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-les-Durance (France). Inst. de Recherche Technologique et de Developpement Industriel (IRDI)
Experience of Super-Phenix fuel fabrication, 12:32803 (R;FR;In French)

CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Inst. de Protection et de Surete Nucleaire
Estimation of beta and gamma radiation doses during an accident occurring in a pressurized water reactor for the qualification of materials, 12:32893 (R;FR;In French)

CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)
Safety automatisms. Application to the ventilation of a hot laboratory, 12:33328 (R;FR;In French)

CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Dept. d'Etudes Mecaniques et Thermiques
Multilevel transport calculations, 12:32823 (R;FR)
On the dynamic buckling of thin shells, 12:32804 (R;FR)

CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Inst. de Recherche Fondamentale (IRF)
Asymptotic completeness and multiparticle analysis in field theories, 12:34120 (R;FR)
Chiral limit in lattice QCD, 12:34237 (R;FR)
Chiral symmetry and strangeness, 12:34094 (R;FR)
Stochastic quantization and B.R.S. symmetry, 12:34238 (R;FR)

Central Electricity Research Labs., Leatherhead (UK)
Sulfate hideout in heated crevices: Final report, 12:32793 (R;US)

Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro
Charm photoproduction results from the Fermilab Tagged Photon Spectrometer, 12:34076 (R;US)

Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu
Computer simulation of lower hybrid current drive in T-7 tokamak, 12:34326 (R;CS)
Initial-value problem for the 1-D wave equation in an inhomogeneous medium, 12:34329 (R;CS)
Joint Czechoslovak-Soviet workshop on current drive in tokamaks, 12:34319 (R;CS;In English and Russian)
Modulation instability and strong Langmuir turbulence of supersonic plasma waves-computer simulations, 12:34325 (R;CS)
On the influence of α-particle cyclotron damping on the lower hybrid current drive, 12:34324 (R;CS)
Possible role of the bootstrap effect in the RF current drive experiments. Part II, 12:34328 (R;CS)
Power dependence of the reflection coefficient at lower hybrid heating, 12:34327 (R;CS)

Ceskoslovenska Komise pro Atomovou Energii, Prague
International meeting on radiation chemistry and processing. Brdicka days 1986 - 20th Czechoslovak meeting. Abstracts, 12:33273 (R;CS)

Ceskoslovenska Spolecnost Nuklearni Mediciny a Radiacni Hygieny
XXIVth days of nuclear medicine. Abstracts of papers, 12:33858 (R;CS;In Czech and Slovak)

Chicago Univ., IL (USA)
Toward the inflationary paradigm: Lectures on inflationary cosmology, 12:34006 (R;US)

Christian Michelsens Inst. for Vitenskap og Aandsfrihet, Bergen (Norway)
Under-estimation of long-term price elasticities of oil demand, 12:33020 (R;NO)

Cincinnati Univ., OH (USA). Dept. of Chemistry
Surface chemistry of electrocatalysts: Annual report, July 1, 1986 through June 30, 1987, 12:33054 (R;US)

Coal Research Association of New Zealand, Wellington
Intermittently-fluidised grate: Final report, 12:32473 (R;NZ)

Coeur d'Alene Tribe, St. Maries, ID (USA)
Report to the Coeur D'Alene Kootenai Nez Perce Shoshone-Bannock and Shoshone-Paiute Tribes on the adoption and enforcement of the model standard for energy conservation in new buildings: Final narrative report, 9/30/83-9/30/84, 12:33061 (R;US)

Colorado School of Mines, Golden (USA). Center for Welding Research
The role of composition and microstructure gradients on weld metal properties and behavior, 12:33140 (R;US)

Colorado School of Mines, Golden (USA). Dept. of Physics
Fundamental optical studies of competitive adsorption and thin film phenomena: Progress report for period July 1, 1986-June 30, 1987, 12:33142 (R;US)

Colorado State Univ., Fort Collins (USA). Dept. of Radiology and Radiation Biology
Radioecological investigations of uranium mill tailings systems: Final report for the period September 1, 1979 through April 30, 1987, 12:33720 (R;US)

Colorado Univ., Boulder (USA)
Charm photoproduction results from the Fermilab Tagged Photon Spectrometer, 12:34076 (R;US)
Diagnostics of glow discharges used to produce hydrogenated amorphous silicon films: Final subcontract report, 15 April 1985-14 April 1986, 12:32641 (R;US)

Colorado Univ., Boulder (USA). Dept. of Chemistry and Biochemistry
Photochemistry of coumarin laser dyes. The role of singlet oxygen in the photo-oxidation of coumarin 311, 12:33361 (R;US)

Columbia Univ., New York (USA)
International ultraviolet explorer observing program: Ultraviolet observations of selected astronomical sources. Semiannual status report, 7 July-31 December 1986, 12:34009 (R;US)

Columbia Univ., New York (USA). Plasma Physics Lab.
MHD simulation of Columbia HBT, 12:34264 (R;US)

Columbia Univ., New York (USA). Radiological Research Lab.
Radiation physics and biology: Progress report for period December 1, 1986-November 30, 1987, 12:33898 (R;US)

Combustion Engineering, Inc., Windsor, CT (USA)
Tests and analyses of crack arrest in reactor vessel materials: Final report, 12:32791 (R;US)

Combustion Engineering, Inc., Windsor, CT (USA). Nuclear Power Systems Div.
Thermal performance diagnostic manual for nuclear power plants: Volume 1, Development of thermal performance diagnostic manual: Final report, 12:32747 (R;US)

Commission of the European Communities, Ispra (Italy). Joint Research Centre
Mesoscale atmospheric dispersion experiments using tracer and tetroons simultaneously at Kernforschungszentrum Karlsruhe, 12:33678 (R;DE)

Commission of the European Communities, Luxembourg
Proceedings of the IAEA Technical committee meeting on Plasma Confinement and Heating in Stellarators, 12:34269 (R;FR)
Proceedings of the IAEA Technical committee meeting on plasma confinement and heating in stellarators, 12:34303 (R;FR)

Cornell Univ., Ithaca, NY (USA). Dept. of Applied and Engineering Physics
Fundamental studies in the molecular basis of laser-induced retinal damage. Annual report, 1 May 1985-30 April 1986, 12:33955 (R;US)

Corrosion Testing Lab., Inc., Newark, DE (USA)
Soil characteristics as criteria for cathodic protection of a nuclear fuel production facility, 12:32536 (R;US)

Council of Great Lakes Governors, Inc., Madison, WI (USA)
Combustion of crop residues for energy: Case studies from the Great Lakes, 12:32611 (R;US)
Industrial commercial wood energy conversion: A guide to wood burning, fuel storage, and handling systems, 12:32612 (R;US)
Wood burning for energy: Case studies from the Great Lakes, 12:32610 (R;US)

D

Daniel Consultants, Inc., Columbia, MD (USA)
Park-and-ride facilities: guidelines for planning design and operation. Final report, September 1984-January 1986, 12:33125 (R;US)

Delaware Univ., Newark (USA). Disaster Research Center
Disaster analysis: emergency management offices and arrangements. Final report on Phase 1, 12:33021 (R;US)

Delaware Univ., Newark (USA). Inst. of Energy Conversion
Photochemical vapor deposition of amorphous silicon photovoltaic devices: Annual subcontract report, 1 May 1985-30 April 1986, 12:32646 (R;US)

Department of Energy, London (UK)
Model surfactant studies II: Effect of alcohol partitioning on phase behaviour experiments, 12:32477 (R;GB)
Model surfactant studies III: Use of the Lever Rule in the optimal pseudo-ternary phase diagram, 12:32478 (R;GB)
Model surfactant studies IV: Summary of first year's progress on phase behaviour 1985-1986, 12:32479 (R;GB)

Department of Energy, Mines and Resources, Elliot Lake, Ontario (Canada). Elliot Lake Lab.
Comparison of dust sampling instruments in coal and uranium ore dust clouds in a dust chamber, 12:32469 (R;CA)

Department of Resources and Energy, Canberra (Australia)
Determination of trace elements in coal and coal products - part 4: methods for the determination of fluorine, boron, beryllium and lithium in coal and coal products, 12:32464 (R;AU)

Deutsche Gesellschaft fuer Luft- und Raumfahrt e.V., Bonn (Germany, F.R.)
Evaluation of man-machine systems - methods and problems, 12:32847 (R;DE;In German)

Deutsche Gesellschaft fuer Wiederaufarbeitung von Kernbrennstoffen m.b.H. (DWK), Hannover (Germany, F.R.)
Events of radioactive waste management - a chronological table, 12:32542 (R;DE;In German)
Systems study 'Alternative Entsorgung'. Final report. Technical annex 6. Technical description of conditioning plant for other spent fuel handling techniques, 12:32543 (R;DE;In German)
Systems study 'Alternative Entsorgung'. Final report. Technical annex 4. Safety related work on the conditioning plant for other fuel removal techniques, 12:32544 (R;DE;In German)
Systems study 'Alternative Entsorgung'. Final report. Technical annex 23. Concept of fuel element processing and final storage in barrels analogous to HAW [Highly-active wastes] glass moulds, 12:32547 (R;DE;In German)
Systems study 'Alternative Entsorgung'. Final report. Technical annex 2. Corrosion investigation on container materials for other fuel disposal techniques, 12:33151 (R;DE;In German)
Systems study 'Alternative Entsorgung'. Final report. Technical annex 1. Technical description of final storage containers for spent fuel elements, 12:33338 (R;DE;In German)

Deutsche Gesellschaft zum Bau und Betrieb von Endlagern fuer Abfallstoffe m.b.H., Peine (Germany, F.R.)
Systems study 'Alternative Entsorgung'. Final report. Technical annex 7. Safety-related work on fuel storage for other fuel disposal techniques, 12:32545 (R;DE;In German)
Systems study 'Alternative Entsorgung'. Final report. Technical annex 23. Concept of fuel element processing and final storage in barrels analogous to HAW [Highly-active wastes] glass moulds, 12:32547 (R;DE;In German)

Dortmund Univ. (Germany, F.R.). Inst. fuer Physik
High resolution tomography with chemical specificity, 12:33230 (R;US)

Drexel Univ., Philadelphia, PA (USA)
A study of the compression ignition of n-butane in an internal combustion engine, 12:33134 (R;US)

Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Plant
Reactor incident status 1981 annual report, 12:32948 (R;US)
The remote handling of canisters containing nuclear waste in glass at the Savannah River Plant, 12:32534 (R;US)
The Savannah River Plant Consolidated Incineration Facility, 12:32537 (R;US)

E

Edinburgh Univ. (UK)
Long spine mooring. A report to the Wave Energy Steering Committee covering work supported by the United Kingdom Department of Energy, 12:32686 (R;GB)
EG and G Energy Measurements, Inc., Goleta, CA (USA). Santa Barbara Operations
High resolution scintillation spectroscopy with HgI_2 as the photodetector, 12:33513 (R;US)
EG and G Energy Measurements, Inc., Los Alamos, NM (USA)
Microwave-induced air breakdown in a free air geometry, 12:34045 (R;US)
EG and G Idaho, Inc., Idaho Falls (USA)
Development and calibration of an aerosol monitor used for PBF [Power Burst Facility] Test SFD [severe fuel damage] 1-4, 12:32874 (R;US)
Field testing of waste forms using lysimeters, 12:32539 (R;US)
In situ testing of the Shippingport Atomic Power Station electrical circuits, 12:32800 (R;US)
INEL RCRA [Resource Conservation and Recovery Act] permit for incineration of hazardous waste: Status report, 12:32538 (R;US)
Laboratory piping system vibration tests to determine parametric effects on damping in the seismic frequency range, 12:32830 (R;US)
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Reactor coolant pump shaft seal stability during station blackout, 12:32992 (R;US)
Review and evaluation of the RELAP5YA computer code and the Vermont Yankee LOCA [Loss-of-Coolant Accident] licensing analysis model for use in small and large break BWR [Boiling Water Reactor] LOCAS, 12:32951 (R;US)
Risk evaluations of aging phenomena: The linear aging reliability model and its extensions, 12:32991 (R;US)
State implementation of the Low-Level Radioactive Waste Policy Amendments Act of 1985: Progress and issues, 12:32595 (R;US)
TMI-2 [Three Mile Island Nuclear Power Station] fuel canister and core sample handling equipment used in INEL hot cells, 12:33335 (R;US)
EG and G/Washington Analytical Services Center, Inc., Albuquerque, NM (USA)
Acurex Solar Corporation Modular Industrial Solar Retrofit qualification test results, 12:32660 (R;US)
Eidgenoessisches Inst. fuer Reaktorforschung, Wuerenlingen (Switzerland)
DEMONA. Annual report 1985, 12:32966 (R;DE;In German)
Eidgenoessische Technische Hochschule, Zurich (Switzerland). Inst. fuer Mittelenergiephysik
Beryllium-10: Half-life and AMS-standards, 12:34162 (R;US)
Electric Power Research Inst., Palo Alto, CA (USA)
Acoustic boiler tube leak detection: Utility experience: Final report, 12:32694 (R;US)
An advanced residential heat pump using the supercharged cycle: Volume 1: Final report, 12:33071 (R;US)
An advanced residential heat pump using the supercharged cycle: Volume 2, Appendix 9, Machine drawings and photographs: Final report, 12:33072 (R;US)
ARMP-02 documentation: Part 2, Chapter 6: CPM-2 computer code manual: Volume 3, Programmer's manual, 12:34445 (R;US)
Characterization of coal pyrolysis liquids: Final report, 12:32457 (R;US)
Coal pretreatment with carbon dioxide and water: Effects on North Dakota lignite and Utah coal: Final report, 12:32458 (R;US)
Commercial assessment of condenser-targeted chlorination: Final report, 12:32703 (R;US)
Comparative evaluation of acoustic holography systems: Topical report, 12:32832 (R;US)
Compensatory mechanisms in fish populations: Literature reviews: Volume 2, Compensation in fish populations subject to catastrophic impact: Final report, 12:32704 (R;US)
Compensatory mechanisms in fish populations: Literature reviews: Volume 1, Critical evaluation of case histories of fish populations experiencing chronic exploitation or impact: Final report, 12:33741 (R;US)
Customer preference and behavior: Residential modeling framework: Final report, 12:33039 (R;US)
Flash crystallization for the control of scaling in geothermal brine: Final report, 12:32685 (R;US)
Gas turbine procurement and combined-cycle repowering: 1986 workshop: Final report, 12:32693 (R;US)
Historical price premiums for low-sulfur coal in the east: Final report, 12:32476 (R;US)
Lubrication guide: Final report, 12:33128 (R;US)
Methodology for calculating combustible gas concentration in radwaste containers: Final report, 12:32541 (R;US)
Modular Modeling System (MMS): Volume 4B, Applications: 1984 code release workshop proceedings, 12:34420 (R;US)
Nuclear plant piping criteria and construction costs: Final report, 12:32819 (R;US)
Production of eddy-current standards for caustic intergranular corrosion: Final report, 12:32790 (R;US)
Simulator-analyzer for binary-cycle geothermal power plants: Volume 1, Executive summary: Final report, 12:32684 (R;US)
Status of commercial wind power: 1986 survey: Final report, 12:32689 (R;US)
Sulfate hideout in heated crevices: Final report, 12:32793 (R;US)
Test and evaluation of a 500-kW vertical-axis wind turbine: Final report, 12:32688 (R;US)
Tests and analyses of crack arrest in reactor vessel materials: Final report, 12:32791 (R;US)
The TN-24P PWR spent-fuel storage cask: Testing and analyses: Interim report, 12:32792 (R;US)
Thermal performance diagnostic manual for nuclear power plants: Volume 1, Development of thermal performance diagnostic manual: Final report, 12:32747 (R;US)
VIPRE [Versatile Internals and Component Program for Reactors; EPRI]-01: A thermal-hydraulic code for reactor cores: Volume 4, Applications: Final report, 12:32952 (R;US)
Zirconium alloy oxidation and hydriding under irradiation: Review of Pacific Northwest Laboratories' test program results: Final report, 12:32880 (R;US)
Electrotek Concepts, Inc., Knoxville, TN (USA)
Utility interconnection issues for wind power generation: Status report, 12:32687 (R;US)
Energy International, Inc., Bellevue, WA (USA)
MicroGas food dryer: technology and market-assessment study. Final report, April-August 1986, 12:32500 (R;US)
Energy Systems Associates, Tustin, CA (USA)
Gas turbine procurement and combined-cycle repowering: 1986 workshop: Final report, 12:32693 (R;US)
Enerscope, Inc., Glendale, AZ (USA)
Advanced desiccant materials assessment. Final report, February 1985-May 1986, 12:33077 (R;US)
Engineering-Science, Inc., Atlanta, GA (USA)
Background data on utility sector fossil fuel-fired facilities: Final report, 12:32700 (R;US)
Impacts of proposed RCRA regulations and other related federal environmental regulations on Fossil Fuel-Fired Facilities: Final report, Volume 1, 12:32701 (R;US)
Engineering-Science, Inc., Fairfax, VA (USA)
Background information document for the development of regulations to control the burning of hazardous wastes in boilers and industrial furnaces, 12:33129 (R;US)
Background information document for the development of regulations to control the burning of hazardous wastes in boilers and industrial furnaces. Volume 2. Industrial furnaces. Draft report, 12:33131 (R;US)
Background information document for the development of regulations to control the burning of hazardous wastes in boilers and industrial furnaces. Volume 1. Industrial boilers. Draft report, 12:33130 (R;US)
Engineers International, Inc., Westmont, IL (USA)
In-situ stress measurements in the earth's crust in the eastern United States, 12:32875 (R;US)

Environmental and Electronic Technologies Corp., Carrollton, TX (USA)
[Automatic filter network protection, failure detection and correction system and methodology]: Fourth quarter 1986, October-December 1986, 12:33334 (R;US)
Environmental Protection Agency, Washington, DC (USA). Office of Pesticide Programs
Creosote and coal tar (non-wood): decision document, 12:33024 (R;US)
Inorganic arsenicals (non-wood use): Position Document 1, 12:33025 (R;US)
Environmental Protection Agency, Washington, DC (USA). Office of Solid Waste
Exploration, development, and production of crude oil and natural gas. (technical report). Field sampling and analytical results, 12:32496 (R;US)
EPRI Nondestructive Evaluation Center, Charlotte, NC (USA)
Comparative evaluation of acoustic holography systems: Topical report, 12:32832 (R;US)
ESSCOR, Solano Beach, CA (USA)
Simulator-analyzer for binary-cycle geothermal power plants: Volume 1, Executive summary: Final report, 12:32684 (R;US)
European Space Agency, 75 - Paris (France)
Population inversions of quantum levels in space and time-dependent fast recombining plasmas. Theory of the recombination laser, 12:33370 (TG;FR)

F

FDO Technische Adviseurs B.V., Amsterdam (Netherlands)
The FLEXHAT-project. The first phase, 12:32690 (R;NL;DU)
Fenix and Scisson, Inc., Las Vegas, NV (USA)
Thread wear evaluation for 7" and 9-5/8" O.D. [outside diameter] casing conducted at the Nevada Test Site: Engineering report, 12:33387 (R;US)
Fermi National Accelerator Lab., Batavia, IL (USA)
Asilomar conference on managing complexity in high energy physics: A summary and renaming of the conference, 12:34071 (R;US)
Charm photoproduction results from the Fermilab Tagged Photon Spectrometer, 12:34076 (R;US)
Combining multipole data, 12:33455 (R;US)
Limits on the abundance and coupling of cosmic axions, 12:34007 (R;US)
Meson West beamline spoiler magnets electrical design and test report, 12:33336 (R;US)
Toward the inflationary paradigm: Lectures on inflationary cosmology, 12:34006 (R;US)
Fish and Wildlife Service, Cook, WA (USA). Willard Field Station
Feeding activity, rate of consumption, daily ration and prey selection of major predators in John Day Reservoirs: Annual report, 1986, 12:33762 (R;US)
Fish and Wildlife Service, Slidell, LA (USA). National Wetlands Research Center
Habitat suitability index models: American alligator, 12:33765 (R;US)
Fish Factory, Davis, CA (USA)
Review of current literature and research on gas supersaturation and gas bubble trauma: Special publication Number 1, 12:33864 (R;US)
Fish Passage Center, Portland, OR (USA)
Water budget managers: 1986 annual report, 12:33027 (R;US)
Florida Univ., Gainesville (USA)
An algorithm for unfolding neutron dose and dose equivalent from digitized recoil-particle tracks, 12:33512 (R;US)
Forest Service, Corvallis, OR (USA). Forestry Sciences Lab.
Abundance, behavior, and habitat utilization by coho salmon and steelhead trout in Fish Creek, Oregon, as influenced by habitat enhancement: Annual report, 1985, 12:33761 (R;US)
Forest Service, Gresham, OR (USA)
Abundance, behavior, and habitat utilization by coho salmon and steelhead trout in Fish Creek, Oregon, as influenced by habitat enhancement: Annual report, 1985, 12:33761 (R;US)
Forest Service, Libby, MT (USA). Kootenai National Forest
Ural-Tweed bighorn sheep, Wildlife Mitigation Project: Annual report, January 1, 1986-December 31, 1986, 12:32617 (R;US)
Forest Service, Salmon, ID (USA). Salmon National Forest
Camas Creek (Meyers Cove) chinook salmon habitat improvement plan: Final report, 12:33764 (R;US)
Frankfurt Univ. (Germany, F.R.). Fachbereich 13 Physik
Emittance growth and space-charge compensation in the transport of intense ion beams, 12:33467 (R;DE;In German)
Frankfurt Univ. (Germany, F.R.). Inst. fuer Angewandte Physik
Emittance growth and space-charge compensation in the transport of intense ion beams, 12:33467 (R;DE;In German)
Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., Saarbruecken (Germany, F.R.). Inst. fuer Zerstoerungsfreie Pruefverfahren
Application of [illegible] for nondestructive testing of reactor components. Final report, 12:33135 (R;DE;In German)
Fraunhofer-Institut fuer [illegible], Freiburg im Breisgau (Germany, F.R.)
Numerical investigation of the dynamic behaviour of the DCB sample, 12:33145 (R;DE;In German)

G

GA Technologies, Inc., San Diego, CA (USA)
Friction and wear behavior of chromium carbide coatings, 12:33178 (R;US)
General Electric Co., San Jose, CA (USA). Nuclear Energy Business Operations
Waste management for Shippingport Station Decommissioning Project: Extended summary, 12:32943 (R;US)
Geological Survey, Denver, CO (USA)
Geologic history and hydrocarbon potential of late cretaceous-age, low-permeability reservoirs, Piceance Basin, western Colorado: Final report, 12:32498 (R;US)
Geological Survey, Reston, VA (USA)
US Geological Survey research in radioactive waste disposal: Fiscal Years, 1983, 1984, and 1985, 12:32529 (R;US)
Use of generator produced neutrons in coal analysis: Quarterly report, December 16, 1986-March 15, 1987, 12:32461 (R;US)
Georgia Inst. of Tech., Atlanta (USA). School of Mathematics
Nonlinear waves in the pellet fusion process, 12:34354 (R;US)
Georgia Inst. of Tech., Atlanta (USA). School of Mechanical Engineering
Isotope separation by chemical exchange process: Final technical report, 12:32596 (R;US)
Georgia Univ., Athens (USA)
Soybean Ribulose bisphosphate carboxylase small subunit gene family: Gene structure and regulation of gene expression: Progress report for the period 6/1/86-5/31/87, 12:32629 (R;US)
The microbiology and physiology of anaerobic fermentations of cellulose: Progress report for the period 9/1/86-5/1/87, 12:32631 (R;US)
Geraghty and Miller, Inc., Oak Ridge, TN (USA)
Monitoring plan for characterization of the Building 3019 leak site, 12:32574 (R;US)
Gesellschaft fuer [illegible] m.b.H. (GRS), Garching (Germany, F.R.)
DEMONA. Annual report 1985, 12:32966 (R;DE;In German)
Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (Germany, F.R.)
10 years of uranium beams at the UNILAC. Proceedings, 12:34155 (R;DE)
Emittance growth and space-charge compensation in the transport of intense ion beams, 12:33467 (R;DE;In German)
Field-theoretical model for the description of nuclear matter in and beyond the thermal equilibrium. Relativistic mean-field theory for nuclear matter with two countercurrent nucleon currents, 12:34186 (R;DE;In German)
Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Neuherberg (Germany, F.R.). Inst. fuer Strahlenschutz
Investigation of atmospheric diffusion by immission measurements of xenon-133 from Fessenheim nuclear power station, 12:33675 (R;DE;In German)

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Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen , Neuherberg (Germany, F.R.). Inst. fuer Toxikologie
In vitro test systems for the identification of gentoxic chemicals in the human environment: The proof of DNA repair synthesis in liver cells, 12:33946 (R;DE;In German)

Gesellschaft fuer Umweltueberwachung m.b.H., Aldenhoven (Germany, F.R.)
Systems study 'Alternative Entsorgung'. 2. Part of final report. Technical annex 18. Calculation of environmental effects of nuclear fuel disposal devices, 12:32515 (R;DE;In German)

Goettingen Univ. (Germany, F.R.). Inst. fuer Voelkerrecht
Annual report 34-37 on the activities of the Institute for International Law of the University of Goettingen, January 1, 1982 to December 31, 1985, 12:32812 (R;DE;In German)

Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii
Calculation technique of tritium and helium production in some materials of nuclear reactors, 12:33146 (R;SU;In Russian)
Effect of heavy and light impurity atoms of Pb and Be and amorphization on high temperature specific heat of Mg or Zr based alloys, 12:33147 (R;SU;In Russian)
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Transmission electron-microscopic studies of structural changes in polycrystalline graphite after high temperature irradiation, 12:33198 (R;SU;In Russian)

Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki
Admissible errors of parameters of a focusing channel for an induction linac with intense electron beam. 2. Beam axis deviations, 12:33458 (R;SU;In Russian)
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Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.
Conservative model of interchannel pulsations, 12:33377 (R;SU;In Russian)
Empirical formulae for velocity fields and coefficients of momentum and heat turbulent transfer in linear channels of intricate shape, 12:32833 (R;SU;In Russian)
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Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij
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Particular solutions of the equation for quark propagator in the infrared region of QCD, 12:34122 (R;SU;In Russian)
Tensor structure of gluon polarization operator in the axial gauge in the infrared region, 12:34121 (R;SU;In Russian)

Grenoble-1 Univ., 74 - Annecy (France). Lab. de Physique des Particules
Representations of the superalgebra F/sub 4/ and Young supertableaux, 12:34118 (R;FR)
R-parity breaking and cosmological consequences, 12:34106 (R;FR)

Grenoble-1 Univ., 38 (France)
Statistical analysis of non-homogeneous Poisson processes. Statistical processing of a particle multidetector, 12:33514 (R;FR;In French)

Grenoble-1 Univ., 38 (France). Inst. des Sciences Nucleaires
1984-1985 ISN progress report, 12:34196 (R;FR;In French)
Direct measurements of total reaction cross sections between heavy ions from 10 to 100 MeV/amu: preliminary conclusions, 12:34193 (R;FR)
Friedel oscillations from the Wigner-Kirkwood distribution in half infinite matter, 12:34191 (R;FR)
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Single and multiparticle Wigner distributions in inhomogeneous Fermi systems, 12:34194 (R;FR)

Grumman Corp., Plainsboro, NJ (USA). Aircraft Systems Div.
Tandem mirror ICRF [ion cyclotron range of frequency] and SRX [Second Region Experiment] physics analyses: Progress report for period August 15, 1986-April 14, 1987, 12:34265 (R;US)

H

Hanford Engineering Development Lab., Richland, WA (USA)
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LMR cladding and duct materials development, 12:32806 (R;US)
Nonlinear piping damping and response predictions, 12:32953 (R;US)

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Hansen Associates, Inc., Annapolis, MD (USA)
Positive cash flow financing in the institutional sector: Final report, 12:33033 (R;US)

Harvard Univ., Boston, MA (USA). School of Public Health
Mechanisms and secondary factors involved in the induction of radiation transformation in vitro, 12:33901 (R;US)

Harvard Univ., Cambridge, MA (USA)
Unraveling photosystems: Progress report, 1984-85, 12:32626 (R;US)
[Unraveling photosystems]: Progress report, July 1, 1982-June 30, 1983, 12:32627 (R;US)

Harvard Univ., Cambridge, MA (USA). Div. of Applied Sciences
Amorphous hydrogenerated silicon germanium alloys suitable for photoelectronic applications: Annual subcontract report, 1 July 1985-30 June 1986, 12:32645 (R;US)

Heidelberg Univ. (Germany, F.R.). Inst. fuer Umweltphysik
Investigation of atmospheric diffusion by immission measurements of xenon-133 from Fessenheim nuclear power station, 12:33675 (R;DE;In German)

Heidelberg Univ. (Germany, F.R.). Naturwissenschaftlich-Mathematische Gesamtfakultaet
α and p emission before, during, and after fission of the fusion nucleus /sup 169/Ta: Nuclear deformation, field emission, and nuclear shadow, 12:34174 (R;DE;In German)

Heidelberg Univ. (Germany, F.R.). Physikalisches Inst.
Distributed data acquisition for BNL802 I: The front end, 12:34410 (R;US)

Hochtief A.G. fuer Hoch- und Tiefbauten, Frankfurt am Main (Germany, F.R.). Abt. Kerntechnischer Ingenieurbau
Investigation of the load characteristic for soft missile impact and results of the Meppen test I/5 to I/9. 4. technical report, 12:32955 (R;DE;In German)

Holt (Ben) Co., Pasadena, CA (USA)
Flash crystallization for the control of scaling in geothermal brine: Final report, 12:32685 (R;US)

Houston Univ., TX (USA). Dept. of Chemical Engineering
Mechanisms of cake filtration: Progress report, April 1986-February 1987, 12:33222 (R;US)

Howard Univ., Washington, DC (USA). School of Engineering
Use of generator produced neutrons in coal analysis: Quarterly report, December 16, 1986-March 15, 1987, 12:32461 (R;US)

Human Machine Interfaces, Inc., Knoxville, TN (USA)
The implications of force reflection for teleoperation in space, 12:33332 (R;US)

Hunter Coll., New York (USA)
ECH [electron cyclotron heating] in the Microwave Tokamak Experiment, 12:34342 (R;US)

I

Idaho Dept. of Fish and Game, Boise (USA)
Freeze brand marking of steelhead trout and chinook salmon from Idaho for the 1986 Smolt Monitoring Program: 1986 annual report, 12:33874 (R;US)
Idaho habitat evaluation for off-site mitigation record: Annual report, 1985, 12:33760 (R;US)
Wildlife protection, mitigation, and enhancement plan, Palisades Project: Final report, 12:33724 (R;US)

Idaho Dept. of Fish and Game, Boise (USA). Program Coordination Bureau
Pacific Northwest Rivers Study assessment guidelines, Idaho, 12:33026 (R;US)

Idaho National Engineering Lab., Idaho Falls (USA)
Decontamination and decommissioning of the initial engine test facility and the IET two-inch hot-waste line, 12:32890 (R;US)
Environmental considerations associated with siting, constructing, and operating a special isotope separation plant at INEL: Volume 1, Proceedings: Report of public hearings, 12:32582 (R;US)
Environmental considerations associated with siting, constructing, and operating a special isotope separation plant at INEL: Volume 2, Proceedings: Report of public hearings, 12:32583 (R;US)
Idaho National Engineering Laboratory: Annual report, 1986, 12:32740 (R;US)
The TN-24P PWR spent-fuel storage cask: Testing and analyses: Interim report, 12:32792 (R;US)

Illinois State Water Survey, Peoria (USA). Water Quality Section
Influences of land uses and stream modifications on water quality in the streams of the Court Creek watershed, 12:33750 (R;US)

Illinois Univ., Chicago (USA). Dept. of Chemical Engineering
Shock tube studies of pyridine pyrolysis and their relation to soot formation, 12:33323 (R;US)

Illinois Univ., Urbana (USA)
Gas-liquid flow in pipelines: Progress report for period July 1, 1986-January 1, 1987, 12:33375 (R;US)

Illinois Univ., Urbana (USA). Dept. of Computer Science
Simulated annealing applied to a problem in combinatorial optimization, 12:34419 (R;US)

Illinois Univ., Urbana (USA). Dept. of Mechanical and Industrial Engineering
Hydrodynamics, mixing, and segregation in gas fluidized beds: Technical progress report, 22 January 1987 to 21 April 1987, 12:33376 (R;US)

Illinois Univ., Urbana (USA). Dept. of Physiology and Biophysics
Photosynthesis in intact plants: [Progress report], 12:32630 (R;US)

Imperial Coll. of Science and Technology, London (UK)
Studies in unsteady flame propagation. Ph.D. thesis, 12:33322 (R;CN)

Indiana Univ., Bloomington (USA)
[Separations of non-volatile components of fossil fuels at very high resolution and their structural characterization: Progress report], 12:32450 (R;US)

Inhalation Toxicology Research Inst., Albuquerque, NM (USA)
Inhalation Toxicology Research Institute: Annual report, October 1, 1985 through September 30, 1986, 12:33947 (R;US)

Institute for Industrial Research and Standards, Dublin (Ireland). Information Technology Group
Retrospective search on densification of forest residues, wood wastes, and agricultural wastes, 12:32635 (R;GB)

Instituto de Engenharia Nuclear, Rio de Janeiro (Brazil)
Determination of the necessary parameters for a protection insulation disk of sodium circuit weighing system for thermomechanical and small component tests, 12:32807 (R;BR;In Portuguese)

International Atomic Energy Agency, Monaco-Ville (Monaco). Lab. of Marine Radioactivity
Intercalibration of analytical methods on marine environmental samples. Results of MEDPOL II exercise for the intercomparison of trace element measurements on mussel tissue homogenate and marine sediment (MA-M-2/TM and SD-N-1/2/TM), 12:33224 (R;XA)
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International Atomic Energy Agency, Seibersdorf (Austria). Laboratories
Qualification of glass bottles for accurate control of the composition of uranium dioxide powder samples, 12:32590 (R;XA)

International Atomic Energy Agency, Vienna (Austria)
Feasibility study on the retrospective evaluation of anomalous local tritium fallout by the analysis of tree rings from selected districts in Austria and Hungary. Final report for the period 1 June 1983-31 May 1986, 12:33676 (R;XA)
In-pile loop experiments in water chemistry and corrosion. Final report for the period 1 May 1982-30 April 1986, 12:33150 (R;XA)
Joint programme on the technical development and further improvement of IAEA safeguards between the Government of the Federal Republic of Germany and the International Atomic Energy Agency. Task C.17. Operations manual for the KfK hybrid K-edge/K-XRF densitometer, 12:32516 (R;DE)
Personnel radiation dosimetry. Proceedings of a technical committee meeting to elaborate procedures and data for the

intercomparison of personnel dosimeters held in Vienna, 22-26 April 1985, 12:33515 (R;XA)
Potential of low-temperature nuclear heat applications. Report of the advisory group meeting held in Wuerenlingen, Switzerland, 9-13 September 1985, 12:32741 (R;XA)
International Atomic Energy Agency, Vienna (Austria). Dept of Safeguards
Generalized procedures for determining inspection sample sizes (related to quantitative measurements). Vol. 1: Detailed explanations, 12:32591 (R;XA)
International Atomic Energy Agency, Vienna (Austria). International Working Group on Fast Reactors
Specialists' meeting on fast reactor cover gas purification: Summary report, 12:32808 (R;XA)
International Inst. for Applied Systems Analysis, Laxenburg (Austria)
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Jet Propulsion Lab., Pasadena, CA (USA)
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Ion implantation parametric study and conducting layer studies for semiconductor contracts: Final report, December 1, 1977 to September 30, 1986, 12:32625 (R;US)
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Mechanistic study of the effects of magnetic fields on scale formation: Progress report for the period September 1, 1986 to August 30, 1987, 12:33748 (R;US)
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Joint FAO/IAEA Div. of Isotope and Radiation Applications of Atomic Energy for Food and Agricultural Development, Vienna (Austria)
Radiotracer studies of pesticide residues in stored products. Report of a research co-ordination meeting on isotopic tracer-aided studies of pesticide residues in stored products held at London, Ontario, Canada, 5-9 May 1986, 12:33875 (R;XA)
Joint Inst. for Nuclear Research, Dubna (USSR)
12. International symposium on nuclear electronics, 12:34156 (R;SU)
Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods
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Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of Radiation Safety
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Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation
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Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy
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Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics

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Karger (S.) AG, Basel (Switzerland)

Proceedings of the 14. International cancer congress held at Budapest, Hungary, 21-27 Aug 1986 v. 1. Abstracts of lectures, symposia and free communications, 12:33789 (R;HU)

Kearney (A.T.), Inc., Chicago, IL (USA)

Protocol for evaluating interim status closure/post-closure plans. Final report, 12:33715 (R;US)
RCRA (Resource Conservation and Recovery Act) permit quality protocol. Final report, 12:33023 (R;US)

Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Radioagronomie

Comparative investigations on the transferability of results from standardized vessel and lysimeter experiments on the actual field conditions with the example of the residue situation in plants after spraying with Goltix and Tribunil, 12:33892 (R;DE;In German)

Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorwerkstoffe

Fission product release profiles from spherical HTR fuel elements at accident temperatures, 12:32965 (R;DE;In German)

Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Programmgruppe Technik und Gesellschaft

International nuclear fuel cycle evaluation (INFCE). An attempt on consensus in international nuclear policy, 12:33031 (R;DE;In German)

Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.)

Joint programme on the technical development and further improvement of IAEA safeguards between the Government of the Federal Republic of Germany and the International Atomic Energy Agency. Task C.17. Operations manual for the KfK hybrid K-edge/K-XRF densitometer, 12:32516 (R;DE)
Systems study 'Alternative Entsorgung'. 2. Part of final report. Technical annex 18. Calculation of environmental effects of nuclear fuel disposal devices, 12:32515 (R;DE;In German)
Systems study 'Alternative Entsorgung'. Final report. Technical annex 6. Technical description of conditioning plant for other spent fuel handling techniques, 12:32543 (R;DE;In German)
Systems study 'Alternative Entsorgung'. Final report. Technical annex 4. Safety related work on the conditioning plant for other fuel removal techniques, 12:32544 (R;DE;In German)
Systems study 'Alternative Entsorgung'. Final report. Technical annex 10. Study on checking the accessibility of spent fuel elements in a fuel store. Phase 1, 12:32546 (R;DE;In German)
Systems study 'Alternative Entsorgung'. Final report. Technical annex 7. Safety-related work on fuel storage for other fuel disposal techniques, 12:32545 (R;DE;In German)
Systems study 'Alternative Entsorgung'. Final report. Technical annex 23. Concept of fuel element processing and final storage in barrels analogous to HAW [Highly-active wastes] glass moulds, 12:32547 (R;DE;In German)
Systems study 'Alternative Entsorgung'. Final report. Technical annex 1. Technical description of final storage containers for spent fuel elements, 12:33338 (R;DE;In German)
Systems study 'Alternative Entsorgung'. Final report. Technical annex 2. Corrosion investigation on container materials for other fuel disposal techniques, 12:33151 (R;DE;In German)

Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Kernphysik 3

Joint programme on the technical development and further improvement of IAEA safeguards between the Government of the Federal Republic of Germany and the International Atomic Energy Agency. Task C.17. Operations manual for the KfK hybrid K-edge/K-XRF densitometer, 12:32516 (R;DE)

Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Material- und Festkoerperforschung

Determination of the creep mechanisms of the SNR structural material X6CrNi1811 (DIN 1.4948) derived from microstructural investigations, 12:33157 (R;DE;In German)
Inherently safe SNR shutdown system with Curie point controlled sensor/switch unit, 12:32872 (R;DE;In German)

Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Meteorologie und Klimaforschung

Mesoscale atmospheric dispersion experiments using tracer and tetroons simultaneously at Kernforschungszentrum Karlsruhe, 12:33678 (R;DE)

Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Lab. fuer Aerosolphysik und Filtertechnik 1

DEMONA. Annual report 1985, 12:32966 (R;DE;In German)

Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Kernfusion

Report on research and development work 1985 on the nuclear fusion project. Annual report of the Association KfK-Euratom, 12:34382 (R;DE;In German)

Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Schneller Brueter

Determination of the creep mechanisms of the SNR structural material X6CrNi1811 (DIN 1.4948) derived from microstructural investigations, 12:33157 (R;DE;In German)

Inherently safe SNR shutdown system with Curie point controlled sensor/switch unit, 12:32872 (R;DE;In German)
KOH Systems, Inc., Rockville, MD (USA)
Technical and economic assessment of particle control technology for direct coal fueled turbines: Final report, 12:32467 (R;US)
Kraftwerk Union A.G., Erlangen (Germany, F.R.)
DEMONA. Annual report 1985, 12:32966 (R;DE;In German)
Kraftwerk Union A.G., Erlangen (Germany, F.R.). Werkstoffe und Chemie
Experimental analysis of the behaviour of iodine in the event of hypothetical accidents. Final report. Pt. 1. Droplet carry-over, 12:32954 (R;DE;In German)

L

Lawrence Berkeley Lab., CA (USA)
A core hole in the southwestern moat of the Long Valley caldera: Early results, 12:32682 (R;US)
A thermal analysis of homes in Bonneville Power Administration's Residential Standards Demonstration Program: Program results report No. 7, 12:33060 (R;US)
Ab initio calculation of ground- and excited-state properties of surfaces, 12:34228 (R;US)
Advanced materials systems as commercial opportunities, 12:33029 (R;US)
Atom-at-a-time radiochemical separations of the heaviest elements: Lawrencium chemistry, 12:33320 (R;US)
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Maintaining optimum fluorescent lamp performance under elevated temperature conditions, 12:33074 (R;US)
Microanalysis of polytypoid ceramics by imaging, diffraction and spectroscopy, 12:34227 (R;US)
Numerical methods for memory fluids: A critical survey, 12:34069 (R;US)
On the convergence of the maximum likelihood estimator method of tomographic image reconstruction, 12:33859 (R;US)
Particle evaporation spectra with inclusion of thermal shape fluctuations, 12:34200 (R;US)
Probing electroweak symmetry breaking at the SSC [Superconducting Super Collider]: A no-lose corollary, 12:34107 (R;US)
Proceedings of the fifth PTCOG meeting and international workshop on biomedical accelerators, 12:33861 (R;US)
Quad fourfold (4 X 4) logic unit (LBL No. 21X6421 P-1), 12:33415 (R;US)
Radon in groundwater of the Long Valley Caldera, California, 12:33752 (R;US)
Silicon radiation detectors with oxide charge state compensation, 12:33612 (R;US)
The effect of lighting system components on lighting quality, energy use, and life-cycle cost, 12:33076 (R;US)
The high sensitivity of the maximum likelihood estimator method of tomographic image reconstruction, 12:33860 (R;US)
The impact of glazing orientation, tilt, and area on the energy performance of roof apertures, 12:33073 (R;US)
Lawrence Livermore National Lab., CA (USA)
A comparison of the heat transfer capabilities of two manufacturing methods for high heat flux water-cooled devices, 12:34390 (R;US)
A finite difference approach to microstrip antenna design, 12:33424 (R;US)
A high average power pockels cell, 12:33371 (P;US)
A method for treating hourglass patterns, 12:34068 (R;US)
A new heavy-ion-beam driver model for the SAFIRE code, 12:34388 (R;US)
A nuclear physics IR [interaction region] for PEP: Issues and conceptual design, 12:33615 (R;US)
A simple and efficient interprocess communication system for actually using a laboratory computer network, 12:34443 (R;US)
A study of the compression ignition of n-butane in an internal combustion engine, 12:33134 (R;US)
A treatment which inhibits surface flashover in vacuum, 12:33423 (R;US)
An antenna engineering handbook for Army and Marine field communication applications, 12:33426 (R;US)
Apparatus for and method of correcting for astigmatism in a light beam reflected off of a light reflecting surface, 12:33359 (P;US)
Assessment of thermal damage to polymeric materials by hydrogen deflagration in the Three Mile Island Unit 2 Reactor Building, 12:32997 (R;US)
Atom-at-a-time radiochemical separations of the heaviest elements: Lawrencium chemistry, 12:33320 (R;US)
Bidirectional reflection functions from surface bump maps, 12:34440 (R;US)
Bonding of silica aerogel with silicone resin GR650, 12:33211 (R;US)
Characteristics and modeling of high voltage photoconductive switching devices, 12:33422 (R;US)
Characteristics of transition radiation in the x-ray spectral region, 12:34046 (R;US)
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Computational issues in electromagnetic coupling to a slit cylinder enclosing an off-set cylinder, 12:34252 (R;US)
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Constitutive models used in computer simulation of time-resolved, shock-wave data, 12:33170 (R;US)
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ECH [electron cyclotron heating] in the Microwave Tokamak Experiment, 12:34342 (R;US)
Electromagnetic susceptibility testing of electronic subsystems by direct injection, 12:33623 (R;US)
Electronics Engineering Department EE technical review, 12:33349 (R;US)
Energy and Technology Review: Engineering technology, 12:33212 (R;US)
Environmental monitoring at the Lawrence Livermore National Laboratory: 1986 annual report, 12:33681 (R;US)
Fundamental gain-bandwidth-volume limitations of antennas, 12:33420 (R;US)
Galaxies and Saturn's rings: Gravitational analogues of nonneutral plasmas, 12:34025 (R;US)
High resolution tomographs with chemical specificity, 12:33230 (R;US)
High-frequency observations of signals and noise near RSON: implications for the discrimination of ripple-fired mining blasts, 12:33649 (R;US)
Improvements in apparatus and procedures for using an organic liquid scintillator as a fast-neutron spectrometer for radiation protection applications, 12:33614 (R;US)
Improving ignition voltage holdoff by heating the wall, 12:33421 (R;US)
Installation/user's guide Version 1.0 for DOEDEF Translator Module Pool A, 12:34406 (R;US)
Integration of the AVLIS [atomic vapor laser isotopic separation] process into the nuclear fuel cycle, 12:32510 (R;US)
Investigation of operating parameters for ICRH antennas on TMX upgrade, 12:34362 (R;US)
Limit on anti ν_e mass from free molecular tritium beta decay, 12:34087 (R;US)
Microwave component compatibility, FY86: Final report, 12:33391 (R;US)
Microwave production from a plasma driven by a high power relativistic electron beam, 12:34049 (R;US)
Modelling and simulation of large solid state laser systems, 12:33366 (R;US)
Nondestructive assay instrumentation for Savannah River Plant reprocessing accountability, 12:32594 (R;US)
Nuclear safety as applied to space power reactor systems, 12:32998 (R;US)
Observation of H$_2$O$_2$ by laser-induced microfluorescence during the direct laser writing of silicon microstructures, 12:33425 (R;US)
ONED: one-dimensional, transient, combined mode heat transfer, 12:33382 (R;US)
Praxis: An alternative to Ada?, 12:34444 (R;US)

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Prediction of risk from indoor exposure to tetrachloroethylene: Pharmacokinetic considerations under steady-state and dynamic exposure conditions, 12:33951 (R;US)
Radioiodine in kelp from western Australia, 12:33753 (R;US)
Recent measurements of coherent transition radiation, 12:34047 (R;US)
SAFIRE: A systems analysis code for ICF [inertial confinement fusion] reactor economics, 12:34387 (R;US)
Seismic noise spectra at Elko, Kanab, Landers, and Mina, 12:33650 (R;US)
Shell model calculations of /sup 90,88/Zr and /sup 90,88/Y, 12:34201 (R;US)
SIGPI: A user's manual for fast computation of the probabilistic performance of complex systems, 12:34430 (R;US)
Sintered composite filter, 12:33357 (P;US)
Software design document for DOEDEF Translator Module Pool A, 12:34437 (R;US)
Solid diffusion subroutine for the NIKE and DYNA finite element codes, 12:33171 (R;US)
Some aspects of the present status of future directions of computational electromagnets, 12:34439 (R;US)
Spent-Fuel Test - Climax: An evaluation of the technical feasibility of geologic storage of spent nuclear fuel in granite: Executive summary of final results, 12:32525 (R;US)
Support mechanism for a mirrored surface or other arrangement and method, 12:33360 (P;US)
Test concept for waste package environment tests at Yucca Mountain, 12:32579 (R;US)
Test of a coaxial-line source model for NEC [Numerical Electromagnetics Code], 12:33427 (R;US)
The effect of data structures on INGRES performance, 12:34453 (R;US)
The hybrid compiler writing system, 12:34438 (R;US)
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The Shadow Mask Sweep family of shadow algorithms, 12:34442 (R;US)
Transient high frequency signal estimation: A model-based processing approach, 12:33419 (R;US)
Use of the WYKO and Sommargren profilers in polishing research, 12:33214 (R;US)
X, y, z positioner, 12:33355 (P;US)

Levy (S.), Inc., Campbell, CA (USA)
ARMP-02 documentation: Part 2, Chapter 6: CPM-2 computer code manual: Volume 3, Programmer's manual, 12:34445 (R;US)

Los Alamos National Lab., NM (USA)
A layered network model of sensory cortex, 12:33766 (R;US)
A method for treating hourglass patterns, 12:34068 (R;US)
Digital time delay, 12:33430 (P;US)
Evaluated delayed neutron precursor data, 12:34182 (R;US)
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How much sequence data will the data banks be processing in the near future?, 12:34450 (R;US)
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Magninos: Experimental consequences and constraints, 12:34105 (R;US)
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Mass spectrometric studies of laser damage in calcium fluoride, 12:33206 (R;US)
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Molecular models for explosives, 12:33643 (R;US)
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Rapid determination of uranium by x-ray fluorescence, 12:33225 (R;US)
Removal of isobaric interferences via pulsed laser resonance ionization mass spectrometry (RIMS) for lead and bismuth mixtures, 12:33226 (R;US)
Smoke clearing by high energy laser beams, 12:34226 (R;US)
Sources of data in the GenBank database, 12:33768 (R;US)
Surface analysis of titanium coated silicone rubber biological implants, 12:33207 (R;US)
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The angular momentum dependence of complex fragment emission, 12:34167 (R;US)
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Theoretical expectations for T-violation in the nucleon-nucleon interaction, 12:34117 (R;US)
Thermal protection apparatus, 12:33624 (P;US)

Los Alamos Technical Associates, Inc., NM (USA)
Cost comparison of horizontal and vertical waste emplacement methods for a repository in tuff, 12:32575 (R;US)
One-twelfth-scale model of horizontal emplacement and retrieval equipment for radioactive waste packages at the proposed repository in tuff, 12:32524 (R;US)
Worker radiation doses during vertical emplacement and retrieval of spent fuel at the tuff repository, 12:32589 (R;US)

Louisiana Dept. of Wildlife and Fisheries, Grand Chenier, LA (USA). Rockefeller Wildlife Refuge
Habitat suitability index models: American alligator, 12:33765 (R;US)

Lyon-1 Univ., 69 - Villeurbanne (France). Inst. de Physique Nucleaire
Decay study of the /sup 117/Cs and /sup 117/Xe nuclei, 12:34175 (R;FR)
Quadrupole moments measured by nuclear orientation, 12:34178 (R;FR;In French)

M

Martin Marietta Energy Systems, Inc., Oak Ridge, TN (USA)
A framework for selection of expert system tools for IBM PC's, 12:34416 (R;US)
Instrumentation Technical Program Management Team: Annual report, FY-1986, 12:32509 (R;US)

Martin Marietta Energy Systems, Inc., Portsmouth, OH (USA). Quality and Technical Services Div.
Instrumentation Technical Program Management Team: Annual report, FY-1986, 12:32509 (R;US)

Martin Marietta Energy Systems, Paducah, KY (USA)
Instrumentation Technical Program Management Team: Annual report, FY-1986, 12:32509 (R;US)

Massachusetts Inst. of Tech., Cambridge (USA)
Steerable beam systems for electron cyclotron resonance heating, 12:34361 (R;US)

Massachusetts Inst. of Tech., Cambridge (USA). Dept. of Materials Science and Engineering
Grain boundaries: Final report, June 16, 1984-June 15, 1987, 12:33141 (R;US)

Massachusetts Inst. of Tech., Cambridge (USA). Lab. for Nuclear Science
The trigger supervisor: Managing triggering conditions in a high energy physics experiment, 12:34412 (R;US)

Massachusetts Inst. of Tech., Cambridge (USA). Nuclear Reactor Lab.
Nuclear reactor and materials science research: Technical report, May 1, 1985-September 30, 1986, 12:32878 (R;US)

Materials Engineering Associates, Inc., Lanham, MD (USA)
A User's Guide to the NRC's Piping Fracture Mechanics Data Base (PIFRAC), 12:32994 (R;US)
Fracture evaluation of surface cracks embedded in reactor vessel cladding: Unirradiated bend specimen results, 12:32838 (R;US)

Max-Planck-Institut fuer Metallforschung, Stuttgart (Germany, F.R.)
Strain and fracture in whisker reinforced ceramics, 12:33196 (R;US)
Max-Planck-Institut fuer Plasmaphysik, Garching (Germany, F.R.)
Density measurements in the boundary layer of the ASDEX RF heated plasma, 12:34318 (R;DE)
Role of plasma equilibrium current in Alfven wave antenna optimization, 12:34317 (R;DE)
Meridian Corp., Falls Church, VA (USA)
Case studies of biomass energy facilities in the Southeastern US, 12:32614 (R;US)
Metrology Control Corp., Richland, WA (USA)
Trend curve data development and testing, 12:32748 (R;US)
Michaels Engineering, Inc., La Crosse, WI (USA)
1983-1984 Wisconsin energy development and demonstration fund: Evaluation of an energy management plan for a school district, 12:33070 (R;US)
Michigan Univ., Ann Arbor (USA)
The angular momentum dependence of complex fragment emission, 12:34167 (R;US)
Michigan Univ., Ann Arbor (USA). Dept. of Atmospheric and Oceanic Science
The ir emission features: Emission from PAH [Polycyclic Aromatic Hydrocarbons] molecules and amorphous carbon particles, 12:34004 (R;US)
Michigan Univ., Ann Arbor (USA). Dept. of Nuclear Engineering
Investigation of operating parameters for ICRH antennas on TMX upgrade, 12:34362 (R;US)
Whistler mode electron cyclotron resonance heating and emission in a magnetic mirror plasma, 12:34267 (R;US)
Michigan Univ., Ann Arbor (USA). Great Lakes Research Div.
Compensatory mechanisms in fish populations: Literature reviews: Volume 2, Compensation in fish populations subject to catastrophic impact: Final report, 12:32704 (R;US)
Ministerio das Relacoes Exteriores, Brasilia (Brazil). Sistema de Informacao Cientifica et Tecnologica do Exterior (SICTEX)
Welding and brazing applied in nuclear engineering, 12:32837 (R;BR;In Portuguese)
Minnesota Univ., Minneapolis (USA). Dept. of Chemical Engineering and Materials Science
Small angle x-ray studies and modeling of coal gasification, 12:32453 (R;US)
Minnesota Univ., St. Paul (USA). Dept. of Genetics and Cell Biology
Molecular approaches to genomic organization: Progress report, 5/15/86 to 5/14/87, 12:33775 (R;US)
Mississippi State Univ., Mississippi State (USA)
Radioactive waste management: Colloidal adsorption of cations and anions: Final technical report, 12:32531 (R;US)
Modar, Inc., Natick, MA (USA)
Detoxification and disposal of hazardous organic chemicals by processing in supercritical water. Final report, 1 June 1980-31 December 1981, 12:33744 (R;US)
Monsanto Research Corp., Miamisburg, OH (USA). Mound
A microcalorimeter used to detect changes in aged energetic materials, 12:33645 (R;US)
A second automated system for measuring the thermal response of the 3Y subassembly, 12:33644 (R;US)
Chemistry of glass-ceramic to metal bonding for header applications: III. Treatment of Inconel 718 to eliminate hot cracking during laser welding, 12:33161 (R;US)
Environmental monitoring at Mound: 1986 report, 12:32584 (R;US)
Mound activities in chemical and physical research: July-December 1986, 12:33220 (R;US)
Preliminary Fabry Perot testing - 1986, 12:33632 (R;US)
The separation and characterization of a hydrogen getter product mixture: Part 2, measurement of product vapor pressures, 12:33254 (R;US)
Montana Dept. of Fish, Wildlife and Parks, Kalispell (USA)
Determination of fishery losses in the Flathead System resulting from the construction of Hungry Horse Dam: Final completion report, 1986, 12:32697 (R;US)
Instream flows needed for successful migration spawning and rearing of rainbow and westslope cutthroat trout in selected tributaries of the Kootenai River: Final report, 1986, 12:32618 (R;US)
Mount Hood National Forest, Estacada, OR (USA). Estacada Ranger District
Abundance, behavior, and habitat utilization by coho salmon and steelhead trout in Fish Creek, Oregon, as influenced by habitat enhancement: Annual report, 1985, 12:33761 (R;US)

N

National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center
Liquid sheet radiator, 12:33380 (R;US)
Mechanical strength and tribological behavior of ion-beam deposited boron nitride films on non-metallic substrates, 12:33185 (R;US)
Thermomechanical behavior of plasma-sprayed ZrO_2-Y_2O_3 coatings influenced by plasticity, creep and oxidation, 12:33186 (R;US)
Utility interconnection issues for wind power generation: Status report, 12:32687 (R;US)
National Aeronautics and Space Administration, Greenbelt, MD (USA). Goddard Space Flight Center
Energetic Phenomena on the Sun: The Solar Maximum Mission Flare Workshop. Proceedings, 12:34010 (R;US)
National Aeronautics and Space Administration, Moffett Field, CA (USA). Ames Research Center
The ir emission features: Emission from PAH [Polycyclic Aromatic Hydrocarbons] molecules and amorphous carbon particles, 12:34004 (R;US)
National Bureau of Standards, Boulder, CO (USA)
Diagnostics of glow discharges used to produce hydrogenated amorphous silicon films: Final subcontract report, 15 April 1985-14 April 1986, 12:32641 (R;US)
Nationale Genossenschaft fuer die Lagerung Radioaktiver Abfaelle (NAGRA), Baden (Switzerland)
Organic complexing agents in low and medium level radioactive waste, 12:32570 (R;CH)
Sampling and chemical analysis of groundwaters from the exploratory boreholes. Exploratory boreholes Boettstein, Weiach, Riniken, Schafisheim, Kaisten, Leuggern, 12:32571 (R;CH;In German)
National Environmental Satellite, Data, and Information Service, Washington, DC (USA). Assessment and Information Services Center
Marine environmental assessment: Gulf of Mexico 1985 annual summary, 12:32495 (R;US)
National Radiation Lab., Christchurch (New Zealand)
Environmental radioactivity: Annual report, 1985, 12:33679 (R;NZ)
National Research Centre for the Physical Sciences Democritos, Athens (Greece)
Chernobyl nuclear accident and its consequences in Greece - Report No. 2, 12:32949 (R;GR;In Greek)
National Research Council of Canada, Ottawa, Ontario
Charm photoproduction results from the Fermilab Tagged Photon Spectrometer, 12:34076 (R;US)
National Research Council, Washington, DC (USA). Panel on Basic Nuclear Data Compilations
Assessment of the current status of basic nuclear data compilations, 12:34154 (R;US)
Nauchno-Issledovatel'skij Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR)
Evaluation of corrosion resistance of niobium or vanadium base alloys in sodium through results of reactor and bench tests, 12:33163 (R;SU;In Russian)
Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad (USSR)
Analysis of thermal regimes of foil extraction windows of electron accelerators, 12:33494 (R;SU;In Russian)
Efficiency of quasirectangular voltage pulse shaping in the circuit of a generator with inductive energy storage and controlled loading, 12:33493 (R;SU;In Russian)
Peculiarities of application of washer- and disk-loaded structures in standing wave electron linacs, 12:33452 (R;SU;In Russian)
Study on the transients in shock-excited homopolar generators with account of transverse motion of an anchor, 12:34383 (R;SU;In Russian)

System for formation of accelerator [illegible] field for industrial radiography, 12:33492 (R;SU;In Russian)
Naval Academy, Annapolis, MD
An antenna engineering handbook for Army and Marine field communic[illegible]n applications, [illegible] (R;US)
Nebraska Univ., Lincoln (USA)
Characterization of plant plasma membrane antigens: [Annual] progress report, 12:33767 (R;US)
Nebraska Univ., Lincoln (USA). Dept. of Chemistry
Electrochemical and optical studies on model photosynthetic systems: Progress report for the period 7/1/84 to 12/1/86, 12:32628 (R;US)
Nebraska Univ., Lincoln (USA). Dept. of Physics
Theory of RBE: Annual technical progress report, 1 January 1987 to 31 December 1987, 12:33[illegible] (R;US)
New Hampshire Governor's Energy Office, Concord (USA)
Distillate fuel oil survey: Final report, [illegible]-1987, 12:32492 (R;US)
New Mexico Inst. of Mining and Technology, Socorro (USA). New Mexico Petroleum Recovery Research Center
Rock matrix and fracture analysis of flow in Western tight gas sands: 1986 annual report: Phase 2, 12:32[illegible] (R;US)
New Mexico Univ., Albuquerque (USA)
Neutron damage equivalence in silicon, silicon dioxide, and gallium arsenide, 12:33210 (R;US)
New Mexico Univ., Albuquerque (USA). Dept. of Geology
A study of natural glass analogues as related to alteration of nuclear waste glass, 12:33208 (R;US)
New Orleans Univ., LA (USA). Dept. of Chemistry
Shock tube studies of pyridine pyrolysis and their relation to soot formation, 12:33323 (R;US)
New York Univ., NY (USA). Courant Inst. of Mathematical Sciences
Global ICRF modeling in large non-circular tokamak plasmas with finite temperature, 12:34261 (R;US)
New Zealand Energy Research and Development Committee, Auckland
Estimation of energy consumption in the New Zealand commercial buildings sector, 12:33091 (R;NZ)
Evaluation of bag filter fabrics for emission control with P.F. [pulverized fuel] fired boilers, 12:32466 (R;NZ)
Geotechnical factors affecting stability of pit slopes in tertiary sediments, Northern Waikato Coal Region, 12:32470 (R;NZ)
Intermittently-fluidised grate: Final report, 12:32473 (R;NZ)
Liquid fuel demand in New Zealand agriculture, 12:33050 (R;NZ)
Rates of drying of four south island lignites, 12:32447 (R;NZ)
Nez Perce Tribe, Lapwai, ID (USA). Fisheries Resource Management
A biological and physical inventory of the streams within the Nez Perce Reservation: Juvenile steelhead survey and factors that affect abundance in selected streams in the lower Clearwater River basin, Idaho: Final report, 12:33759 (R;US)
Noell G.m.b.H., Wuerzburg (Germany, F.R.). Abt. Kernenergietechnik
Systems study 'Alternative Entsorgung'. Final report. Technical annex 10. Study on checking the availability of spent fuel elements in a fuel store. Phase 1, 12:32946 (R;DE;In German)
North Carolina Univ., Chapel Hill (USA). Dept. of Geology
Peat deposits of North Carolina: [illegible]s, 12:33468 (R;US)
Northwestern Univ., Chicago, IL (USA)
Interfacial electrochemical transport in devices employing solid electrolytes: Annual report and renewal proposal, 12:33017 (R;US)
Northwest Small Hydro[illegible] [illegible], OR (USA)
Data collection for resource [illegible]. Final report, 1985, 12:32616 (R;US)
Nuclear Development Corp. of [illegible], Pelindaba, Pretoria
Evaluation of the uranium [illegible] Complex. Atomic Energy Corporation [illegible] Limited and University of Pretoria [illegible] in the Bushveld Complex: [illegible], 12:32306 (R;ZA)
Uranium potential of the [illegible] South Africa. Atomic Energy Corporation [illegible] Limited and University of Pretoria [illegible] in the Bushveld Complex: progress [illegible], 12:32305 (R;ZA)
Nuclear Regulatory Commission, Washington, DC (USA)
Thermal-hydraulic studies on [illegible] interactions, 12:32891 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Div. of Emergency Preparedness and Engineering Response
Closeout of IE Bulletin 78-08: Radiation levels from fuel element transfer tubes, 12:32986 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Div. of Engineering
A User's Guide to the NRC's Piping Fracture Mechanics Data Base (PIFRAC), 12:32994 (R;US)
Control of water infiltration into near surface LLW [low level waste] disposal units: Annual report, October 1985-September 1986, 12:32573 (R;US)
Fracture evaluation of surface cracks embedded in reactor vessel cladding: Unirradiated bend specimen results, 12:32838 (R;US)
Unsaturated flow and transport through fractured rock related to high-level waste repositories: Final report, Phase 2, 12:32572 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Div. of Engineering Safety
Analysis of experiments on stainless steel flux welds, 12:33164 (R;US)
Assessment of design basis for load-carrying capacity of weld-overlay repairs, 12:32753 (R;US)
Experimental and analytical assessment of circumferentially surface-cracked pipes under bending, 12:32839 (R;US)
In-situ stress measurements in the earth's crust in the eastern United States, 12:32875 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Div. of Engineering Technology
In situ testing of the Shippingport Atomic Power Station electrical circuits, 12:32800 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Div. of Publications Services
Nuclear Regulatory Commission issuances, 12:32814 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Div. of Reactor Accident Analysis
Heat of reaction of molten zirconium with UO_2, 12:32993 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Div. of Reactor and Plant Systems
Guidelines and procedures for the International Code Assessment and Applications Program, 12:34403 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Div. of Reactor Systems Safety
Analysis of core damage frequency from internal events: Sequoyah, Unit 1, 12:32987 (R;US)
Evaluation of severe accident risks and the potential for risk reduction: Sequoyah Power Station, Unit 1, 12:32988 (R;US)
SIGPI: A user's manual for fast computation of the probabilistic performance of complex systems, 12:34430 (R;US)
Zircaloy-4 oxidation at 1300 to 2400°C, 12:33165 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Div. of Safety Review and Oversight
Shutdown Decay Heat Removal analysis of a Westinghouse 3-loop pressurized water reactor: Case study, 12:32990 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Div. of Technical Information and Document Control
Nuclear Regulatory Commission Issuances, October 1986, 12:33032 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Office for Analysis and Evaluation of Operational Data
Licensee Event Report (LER): Compilation for month of March 1987, 12:32815 (R;US)
Report to Congress on abnormal occurrences, July-September 1986, 12:32813 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Office of Information Resources Management
Licensed operating reactors: Status summary report, data as of 07-31-86, 12:32750 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation
Safety Evaluation Report related to the operation of Braidwood Station, Units 1 and 2 (Docket Nos. 50-456 and 50-457), 12:32967 (R;US)
Technical specifications, Braidwood Station, Unit Nos. 1 and 2 (Docket Nos. STN 50-456 and STN 50-457): Appendix "A" to License No. NPF-70, 12:32968 (R;US)
Technical Specifications: Clinton Power Station, Unit No. 1 (Docket No. 50-461): Appendix "A" to License No. NPF-62, 12:32751 (R;US)

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Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Regulatory Research
A study of natural glass analogues as applied to alteration of nuclear waste glass, 12:33208 (R;US)
Reactor coolant pump shaft seal stability during station blackout, 12:32992 (R;US)
Uncertainty papers on severe accident source terms, 12:32969 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Research
Coolability of stratified UO_2 debris in sodium with downward heat removal: The D13 experiment, 12:32989 (R;US)
Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.)
Systems study 'Alternative Entsorgung'. Final report. Technical annex 6. Technical description of conditioning plant for other spent fuel handling techniques, 12:32543 (R;DE;In German)
Systems study 'Alternative Entsorgung'. Final report. Technical annex 23. Concept of fuel element processing and final storage in barrels analogous to HAW [Highly-active wastes] glass moulds, 12:32547 (R;DE;In German)
Systems study 'Alternative Entsorgung'. Final report. Technical annex 4. Safety related work on the conditioning plant for other fuel removal techniques, 12:32544 (R;DE;In German)
Systems study 'Alternative Entsorgung'. Final report. Technical annex 1. Technical description of final storage containers for spent fuel elements, 12:33338 (R;DE;In German)
Systems study 'Alternative Entsorgung'. Final report. Technical annex 2. Corrosion investigation on container materials for other fuel disposal techniques, 12:33151 (R;DE;In German)

O

Oak Ridge Gaseous Diffusion Plant, TN (USA)
Addendum to preliminary safety analysis report, Centrifuge Plant Demonstration Facility, Building K-1220, 12:32508 (R;US)
Ford Aerospace High-G Test Series II and III, 12:33340 (R;US)
Integration of the AVLIS [atomic vapor laser isotopic separation] process into the nuclear fuel cycle, 12:32510 (R;US)
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Oak Ridge National Lab., TN (USA)
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Acid rain: Implications for the Lake States forests, 12:33714 (R;US)
Advances in concurrent computation for machine intelligence and robotics, 12:33330 (R;US)
An eddy-current laboratory test system using commercial equipment, 12:33388 (R;US)
Application of the LEPRICON methodology to LWR pressure vessel surveillance dosimetry, 12:32760 (R;US)
Beryllium-10: Half-life and AMS-standards, 12:34162 (R;US)
Calculational assessment of critical experiments with mixed oxide fuel pin arrays moderated by organic solution, 12:32513 (R;US)
Corn products as chemical feedstocks: The corn refinery, 12:32624 (R;US)
Development of BWR [boiling water reactor] and PWR [pressurized water reactor] event descriptions for nuclear facility simulator training, 12:32745 (R;US)
Development of Fe_3Al-based aluminides, 12:33139 (R;US)
Dynamic task allocation for a man-machine symbiotic system, 12:33333 (R;US)
Economic considerations of atmospheric deposition, 12:33684 (R;US)
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Examination of U_3Si_2-Al fuel elements from the Oak Ridge Research Reactor, 12:32876 (R;US)
Gas engineering for pulsed power and switching, 12:33413 (R;US)
Global ICRF modeling in large non-circular tokamak plasmas with finite temperature, 12:34261 (R;US)
Global ion cyclotron waves in a perpendicularly stratified, one-dimensional warm plasma, 12:34339 (R;US)
Heavy-Section Steel Technology Program: Semiannual progress report for April-September 1986, 12:32752 (R;US)
High Flux Isotope Reactor: Quarterly report, July through September 1986, 12:32884 (R;US)
High flux isotope reactor: Quarterly report October through December 1986, 12:32885 (R;US)
High resolution measurement of the ^{238}U neutron capture yield for incident neutron energies between 1 and 100 keV, 12:34181 (R;US)
Interpretation of subcriticality measurements with strong spatial effects, 12:34185 (R;US)
JASPER: A joint US-Japan program of experimental shielding research, 12:32805 (R;US)
Licensee Event Report (LER): Compilation for month of March 1987, 12:32815 (R;US)
Measurement of inelasticities for charge correlated multiple ionization of Ne by fast C^{6+} ions, 12:34037 (R;US)
Modeling of compact loop antennas, 12:34358 (R;US)
Motor current signature analysis for determining operational readiness of motor-operated valves (MOVs), 12:32829 (R;US)
Multi-sensor integration using concurrent computing, 12:33331 (R;US)
Oak Ridge Research Reactor: Quarterly report, July, August, and September 1986, 12:32883 (R;US)
Point kernel versus radiation transport for iron deep penetration problems, 12:32581 (R;US)
Recommended CAI approach for the NALDA system, 12:34405 (R;US)
Remote handling facility and equipment used for space truss assembly, 12:32512 (R;US)
Second harmonic electron cyclotron heating calculations for the ATF [Advanced Toroidal Facility] torsatron, 12:34262 (R;US)
SEMMSS accelerometer mount transmissibility evaluation, 12:33631 (R;US)
Some practical considerations involving spectral representations of 3-D plasma equilibria, 12:34340 (R;US)
Status of the Oak Ridge National Laboratory new hydrofracture facility: Implications for the disposal of liquid low-level radioactive wastes by underground injection, 12:32527 (R;US)
Strain and fracture in whisker reinforced ceramics, 12:33196 (R;US)
Subsurface data base for Bear Creek Valley, Chestnut Ridge, and parts of Bethel Valley on the US Department of Energy Oak Ridge Reservation, 12:33978 (R;US)
Summary and analsysis of the 1986 ORNL personnel dosimetry intercomparison study, 12:33941 (R;US)
Test of carcinogenicity in mouse skin: Methylenedianiline, γglycidyloxytrimethyloxysilane, γaminopropyltriethoxysilane and a mixture of m-phenylenediamine, methylenedianiline, and diglycidylether of bisphenol-A, 12:33948 (R;US)
The angular momentum dependence of complex fragment emission, 12:34167 (R;US)
The ATF [Advanced Toroidal Facility] Status and Control System, 12:34357 (R;US)
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The design of high-power ICRF antennas for TFTR and Tore Supra, 12:34359 (R;US)
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The implications of force reflection for teleoperation in space, 12:33332 (R;US)
The safety implications of control systems program at ORNL, 12:32945 (R;US)
Two-bar thermal ratchetting of annealed 2.25Cr-1Mo steel, 12:33138 (R;US)
VELM61 and VELM22: Multigroup cross-section libraries for sodium-cooled reactor shield analysis, 12:32809 (R;US)
Worldwide fallout of plutonium from nuclear weapons tests, 12:33680 (R;US)
Oak Ridge National Lab., TN (USA). Data Systems Research and Development Program
Recommendation on expert systems application for troubleshooting support of specific Navy minicomputer operations, 12:34431 (R;US)
Oak Ridge Y-12 Plant, TN (USA)
Computer integrated manufacturing in the Oak Ridge Y-12 Plant: A technology baseline, 12:33350 (R;US)
Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H.
Archaeology of computer codes - illustrated on the basis of the code SABINE, 12:32995 (R;AT;In German)

Consoldating conservation of agricultural tools from the Austrian Museum of Folklore, 12:34401 (R;AT;In German)
Report 1985 of the Austrian Research Centre Seibersdorf. Abridged version, 12:34404 (R;AT)
Seiberdorf scientists give answers to questions in connection with the Chernobyl reactor accident, 12:33721 (R;AT;In German)

Oklahoma Univ., Norman (USA). Energy Resources Inst.
NURE HSSR [National Uranium Resource Evaluation - Hydrogeochemical and Stream Sediment Reconnaissance] Quadrangle Summary Tables: Alaska, Volume 12, 12:33995 (R;US)

Oregon State Univ., Corvallis (USA). Dept. of Microbiology
Epidemiology and control of infectious diseases of salmonids in the Columbia River Basin: Annual report, FY 1986, 12:33865 (R;US)

Organization for Economic Co-Operation and Development, 75 - Paris (France)
Combustion of straw, 12:32613 (R;FR)

Otago Univ., Dunedin (New Zealand). Dept. of Chemistry
Rates of drying of four south island lignites, 12:32447 (R;NZ)

P

Pacific Northwest Lab., Richland, WA (USA)
1985 Residential Occupant Survey-Telephone, 12:33058 (R;US)
A fisheries evaluation of the Richland and Toppenish/Satus Canal fish screening facilities, Spring 1986: Annual report, 1986, 12:33758 (R;US)
Analysis of thermal performance data taken under the Residential Standards Demonstration Program, 12:33059 (R;US)
Heat of reaction of molten zirconium with UO_2, 12:32993 (R;US)
HYDRA-II: A hydrothermal analysis computer code: Volume 1, Equations and numerics, 12:32523 (R;US)
Pacific Northwest Laboratory: Annual report for 1986 to the DOE Office of Energy Research: Part 1, Biomedical sciences, 12:33942 (R;US)
SOLERGY; A computer code for calculating the annual energy from central receiver power plants, 12:32657 (R;US)
Stable attachment of TiB_2-based cathodes for the aluminium industry: Review and recommendation, 12:33187 (R;US)
The TN-24P PWR spent-fuel storage cask: Testing and analyses: Interim report, 12:32792 (R;US)
VIPRE [Versatile Internals and Component Program for Reactors; EPRI]-01: A thermal-hydraulic code for reactor cores: Volume 4, Applications: Final report, 12:32952 (R;US)
Zircaloy-4 oxidation at 1300 to 2400°C, 12:33165 (R;US)
Zirconium alloy oxidation and hydriding under irradiation: Review of Pacific Northwest Laboratories' test program results: Final report, 12:32880 (R;US)

Parameter, Inc., Elm Grove, WI (USA)
Closeout of IE Bulletin 78-08: Radiation levels from fuel element transfer tubes, 12:32986 (R;US)

Paris-11 Univ., 91 - Orsay (France). Inst. de Physique Nucleaire
Percolation approach to nucleus break up, 12:34188 (R;FR)
Relativistic description of nuclear systems in the Hartree-Fock approximation, 12:34189 (R;FR)
Review of Bose-Fermi and "Supersymmetry" models; problems in particle transfer tests, 12:34187 (R;FR)

Paris-13 Univ., 93 - Saint-Denis (France)
Gas chromatographic analysis of extractive solvent in reprocessing plants, 12:32514 (R;FR;In French)

Pennsylvania Univ., Philadelphia (USA). Dept. of City and Regional Planning
Transit perspectives to the year 2000: possible consequences of doing nothing. Final report, 12:33124 (R;US)

Physics Applications, Inc., Chattanooga, TN (USA)
Development of BWR [boiling water reactor] and PWR [pressurized water reactor] event descriptions for nuclear facility simulator training, 12:32745 (R;US)

Pittsburgh Univ., PA (USA)
Novel experimental studies for coal liquefaction: Quarterly progress report, January 1, 1987 to March 31, 1987, 12:32454 (R;US)

Plastic Casting, Inc., Olean, NY (USA)
Development of an electret passive environmental radon monitor: Final report, 12:33613 (R;US)

Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan)
JASPER: A joint US-Japan program of experimental shielding research, 12:32805 (R;US)

Princeton Univ., NJ (USA). Plasma Physics Lab.
Global ICRF modeling in large non-circular tokamak plasmas with finite temperature, 12:34261 (R;US)

Professional Wildlife Service, Baton Rouge, LA (USA)
Habitat suitability index models: American alligator, 12:33765 (R;US)

Purdue Univ., Lafayette, IN (USA)
Fragment emission in proton-xenon interactions in the near-threshold regime, 12:34172 (R;US)

Q

Queen Elizabeth II Medical Centre, Nedlands (Australia)
Radioiodine in kelp from western Australia, 12:33753 (R;US)

R

RCA Labs., Princeton, NJ (USA)
Laser materials for the 0.67-microns to 2.5-microns range. Final Report, 23 September 1985-18 June 1986, 12:33363 (R;US)

Rensselaer Polytechnic Inst., Troy, NY (USA)
Research on semiconductors for high-efficiency solar cells: Annual subcontract report, 1 September 1985-31 August 1986, 12:32644 (R;US)

Resource Dynamics Corp., Vienna, VA (USA)
Historical price premiums for low-sulfur coal in the east: Final report, 12:32476 (R;US)

Rhode Island Dept. of Administration, Providence (USA). Div. of Planning
Rhode Island crystalline repository siting project: Technical progress report, Calendar year 1986, 12:32530 (R;US)

Rhode Island Univ., Narragansett (USA). Graduate School of Oceanography
Compensatory mechanisms in fish populations: Literature reviews: Volume 1, Critical evaluation of case histories of fish populations experiencing chronic exploitation or impact: Final report, 12:33741 (R;US)

Rittmann (Bruce E.) and Associates, Urbana, IL (USA)
Study estimating VOC (volatile organic compound) emissions from the Calumet Sewage Treatment Plant in the Chicago area, 12:33656 (R;US)

Rochester Univ., NY (USA). Dept. of Physics and Astronomy
Limits on the abundance and coupling of cosmic axions, 12:34007 (R;US)

Rochester Univ., NY (USA). Lab. for Laser Energetics
Inertial fusion program and National Laser Users Facility projects: Annual report, 1 October 1979-30 September 1980, 12:34360 (R;US)

Rockwell International Corp., Canoga Park, CA (USA)
Space transportation booster engine (STBE) configuration study. Quarterly review report, 12:33133 (R;US)

Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant
Computerization upgrade project for the Rocky Flats Plant Critical Mass Laboratory Reactor Control Console, 12:32873 (R;US)
Processing depleted uranium quad alloy penetrator rods, 12:33167 (R;US)
Remote engineering progress report, January through December 1985, 12:33343 (R;US)

Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations
Lessons learned from hydrogen generation and burning during the TMI-2 event, 12:32996 (R;US)

S

Sandia National Labs., Albuquerque, NM (USA)
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Proceedings of the Fast Burst Reactor Workshop held in Albuquerque, NM, April 8 - 10, 1986, 12:32886 (R;US)
Radiation damage annealing effects at elevated temperatures in bipolar transistors for severe space environments, 12:33622 (R;US)
Sandia programs relevant to microelectronics fabrication, 12:33418 (R;US)
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The effects of high temperature and total dose gamma radiation on a power MOSFET [metal-oxide semiconductor field effect transistor] (N-channel) and an operational amplifier, 12:33416 (R;US)
The retention characteristics of nonvolatile SNOS memory transistors in a radiation environment: Experiment and model, 12:33621 (R;US)
The Subseabed Disposal Project institutional program activities, October 1982 through September 1984, 12:32576 (R;US)
Thermal ignition of Ti-based pyrotechnics I: Ti oxidation mechanism and kinetics, 12:33646 (R;US)
Thermal ignition of Ti-based pyrotechnics II: Ti oxidation kinetics applied to analysis of slow ignition (DTA) experiments, 12:33324 (R;US)
Transonic nozzle flow instability due to shock wave/condensation front interaction, 12:33381 (R;US)
Version II of the users manual for the Tuff Data Base Interface, 12:34451 (R;US)
Worker radiation doses during vertical emplacement and retrieval of spent fuel at the tuff repository, 12:32589 (R;US)

Sandia National Labs., Livermore, CA (USA)
A study of the compression ignition of n-butane in an internal combustion engine, 12:33134 (R;US)
An evaluation of consumable inserts for gas tungsten arc welding, 12:33169 (R;US)
High resolution tomography with chemical specificity, 12:33230 (R;US)
Solar fuels and chemicals system design study - production and regeneration of activated carbon: Final report: Volume 3, Appendices, 12:32658 (R;US)
SOLERGY; A computer code for calculating the annual energy from central receiver power plants, 12:32657 (R;US)

Savannah River Lab., Aiken, SC (USA)
Ford Building Seepage Basin: Environmental information document, 12:33726 (R;US)
L-Area Oil and Chemical Basin: Environmental information document, 12:33725 (R;US)
Material interactions relating to long-term geologic disposal of nuclear waste glass, 12:32535 (R;US)
Old TNX Seepage Basin: Environmental information document, 12:33727 (R;US)
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Residual stresses at pinch welds in small stainless steel tubes, 12:33143 (R;US)
Soil characteristics as criteria for cathodic protection of a nuclear fuel production facility, 12:32536 (R;US)

Schafer (W.J.) Associates, Inc., Pleasanton, CA (USA)
A new heavy-ion-beam driver model for the SAFIRE code, 12:34388 (R;US)

Science Applications International Corp., Sunnyvale, CA (USA)
Development of a solid/liquid/gas phase fraction meter: Final report, 12:32452 (R;US)

Scientific Systems International, Los Alamos, NM (USA)
The Los Alamos Neutron Scattering Center data acquisition system, 12:34428 (R;US)

Skoda, Plzen (Czechoslovakia). Zavod Vystavba Jadernych Elektraren
Ensuring the nuclear safety of VVER-440 reactor pressure vessels in Skoda, Concern Enterprise, Plzen, 12:32999 (R;CS)
Reliability aspects of radiation damage in reactor pressure vessel mterials, 12:33000 (R;CS)

Slovenska Akademia Vied, Kosice (Czechoslovakia). Ustav Experimentalnej Fyziky
Proposal for an experiment for studying reactions $\pi^+ n \rightarrow phip$ and $\pi^+ n \rightarrow \omega p$ at the HYPERON facility, 12:34088 (R;CS;In Russian)

Solar Energy Research Inst., Golden, CO (USA)
Amorphous hydrogenerated silicon germanium alloys suitable for photoelectronic applications: Annual subcontract report, 1 July 1985-30 June 1986, 12:32645 (R;US)
Diagnostics of glow discharges used to produce hydrogenated amorphous silicon films: Final subcontract report, 15 April 1985-14 April 1986, 12:32641 (R;US)
Photochemical vapor deposition of amorphous silicon photovoltaic devices: Annual subcontract report, 1 May 1985-30 April 1986, 12:32646 (R;US)
Polycrystalline thin films: Annual report FY 1986, 12:32640 (R;US)
Research on high-efficiency, single-junction, monolithic, thin-film amorphous silicon solar cells: Annual subcontract report, May 1985 - Jul 1986, 12:32642 (R;US)
Research on high-efficiency, stacked, multi-junction, amorphous silicon alloy thin-film solar cell: Semiannual subcontract report; 15 October 1985 - 30 April 1986, 12:32643 (R;US)
Research on semiconductors for high-efficiency solar cells: Annual subcontract report, 1 September 1985-31 August 1986, 12:32644 (R;US)
Solarex Corp., Rockville, MD (USA)
Photovoltaic water pumping for Bolivia, 12:32652 (R;US)
Southern California Edison Co., Rosemead (USA)
Test and evaluation of a 500-kW vertical-axis wind turbine: Final report, 12:32688 (R;US)
Southern Illinois Univ., Carbondale (USA). Coal Extraction and Utilization Research Center
Electrochemical desulfurization of coal slurries: Reaction rate studies: Annual report, March 1, 1986-February 28, 1987, 12:32456 (R;US)
Mechanism of extraction and desulfurization of coals with alcohols: Final report, March 1, 1986-February 28, 1987, 12:32455 (R;US)
Microbial removal of organic sulfur from coal (bacterial degradation of sulfur-containing heterocyclic compounds): Final report, March 1, 1986-February 28, 1987, 12:32465 (R;US)
Microcrystalline iron sulfide particles in coal: A Moessbauer study: Final report, March 1, 1986-February 28, 1987, 12:32462 (R;US)
Mixing of sulfur between pyritic and organic phases during coal conversion processes: Annual final report, March 1, 1986-February 28, 1987, 12:32463 (R;US)
Modeling the impacts of changing coal technology and policy: Final report, March 1, 1986-February 28, 1987, 12:33038 (R;US)
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USDOE Energy Information Administration, Washington, DC. Office of Energy Markets and End Use
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The notations in the final parentheses indicate the type of document, e.g., R for Report; the country of publication, e.g., US; and the language if other than English, e.g., In German. Tables of document types and country of publication codes appear after the indexes.

The title may be supplemented with additional words, or a phrase, if it appears additional information would be helpful. In cases for which the title contains little or no information related to the subject entry, it may be replaced entirely by the supplementary information. A qualifier is not always required, and in such cases the title will follow the unqualified subject descriptor.

The descriptors selected for use as subject terms are generally the names of specific materials, things, or processes. To the extent possible, a qualifier is selected to describe the properties of, or processes applied to, the subject term.

Index entries are selected to indicate the important ideas and concepts presented in a document, rather than words that may appear in the text. Within the available thesaurus terms, the most probable or logical place to look for typical information is selected. "See references" are included to guide users from synonymous terms or phrases to the descriptor selected as a subject heading for the concept (e.g., Pipeline Quality Gas, see HIGH BTU GAS). "See also references" are used to indicate where to find references to subject concepts that are narrower, broader, or related to a particular subject heading. To complete an exhaustive search of a given subject, all such headings should be reviewed. Copies of DOE/TIC-7000, the Subject Thesaurus, are available from the National Technical Information Service (NTIS), U.S. Department of Commerce, Springfield, VA 22161.

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Removal
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ORGANIC MATTER
Only for unspecified materials containing chain and ring compounds of carbon; if specific organic compounds are studied, use descriptors for the compounds.
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Biodegradation
Energy generation and the sulfur-carbon cycles: Final technical report for period March 1981 thru February 1985, 12:33749 (R;US)

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Synthesis of aminooxycarbene complexes of iron with N-alkyl, -allyl, and -carbamoyl groups, 12:33260 (J;US)

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86-1	NTIS, PC A99/MF A01; 1 (GPO Dep.)	E 1.99: DE87010055	MN -34C	12:34153
AR-				
26/ 87	*See* OEFZS-4383	DE87702400	MN -51	12:33721
BARC-				
1280	NTIS (US Sales Only), PC A03; 3	DE87900810	MN -25	12:33194
1283	NTIS (US Sales Only), PC A03; 3	DE87900809	MN -25	12:33195
BDX-				
613-3724	NTIS, PC A05; 3	DE87010552	STD -11	12:33722
613-3742	NTIS, PC A05/MF A01; 1 (GPO Dep.)	E 1.99: DE87009101	STD -38	12:33327
613-3748	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99: DE87009099	STD -38	12:33386
613-3758	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87009391	MN -32	12:34408
BF-R-				
65.523-12	*See* KFK-4182	DE87751926	MN -80	12:32966
BM-IC-				
9103	*See* PB-87-164448/XAB			12:32504
BMI-				
2149	*See* NUREG/CR-4872	TI87900678	MN -78	12:32839
2150	*See* NUREG/CR-4877	TI87900636	MN -78	12:32753
2151	*See* NUREG/CR-4878	TI87900672	MN -38	12:33164
BNL-				
36214	NTIS, PC A02; 3	DE87010074	MN -34A	12:34225
39204	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87007144	MN -63	12:32620
39208	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87007145	MN -63	12:32621
39404	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87007632	MN -28	12:33510
39536	NTIS, PC A02; 3	DE87008199	MN -38	12:34409
39553	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87008718	MN -48	12:32622
39591	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87010450	MN -41	12:33022

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39613	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87008714	MN -28	12:33454
39666	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE87010453	MN -13	12:33653
39694	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE87010044	MN -63	12:32623
39748	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87010064	MN -48	12:33894
39793	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87010451	MN -41	12:33895
39806	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87010445	MN -34	12:34410
39807	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87010446	MN -34	12:34411
39808	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87010444	MN -34	12:34412
39809	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87010443	MN -32	12:34413
39810	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87010442	MN -32	12:34414
52020	NTIS, PC A09/MF A01; 1 (GPO Dep.)	E 1.99: DE87008602	STD -70B	12:32526
52036	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99: DE87010641	STD -13	12:34415
52062	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE87009993	STD -95d	12:33056
BNL-NUREG-				
39412	NTIS, PC A02/MF A01 - GPO	TI87006905	MN -78	12:32891
39596	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87008719	MN -80	12:32892
CAL-				
1638	*See* N-87-17584			12:34009
CBPF-NF-				
031/ 87	*See* FNAL/C-87/37-E	E 1.99: DE87007960	MN -34D	12:34076
CEA-CONF-				
8314	NTIS (US Sales Only), PC A02/MF A01	DE87751806	MN -34D	12:34237
8383	NTIS (US Sales Only), PC A02/MF A01	DE87751837	MN -38	12:33328
8723	NTIS (US Sales Only), PC A02/MF A01	DE87751815	MN -78	12:32893
8738	NTIS (US Sales Only), PC A02/MF A01	DE87751816	MN -79	12:32803
8761	NTIS (US Sales Only), PC A02/MF A01	DE87751814	MN -80	12:32823
8763	NTIS (US Sales Only), PC A02/MF A01	DE87751813	MN -80	12:32804
8775	NTIS (US Sales Only), PC A02/MF A01	DE87751811	MN -34D	12:34238
8776	NTIS (US Sales Only), PC A02/MF A01	DE87751810	MN -34D	12:34120
8777	NTIS (US Sales Only), PC A02/MF A01	DE87751812	MN -34D	12:34094
CEA-SPhT-				
86-147	*See* CEA-CONF-8777	DE87751812	MN -34D	12:34094
CESAR-				
87/ 10	*See* CONF-870567-2	DE87007666	MN -38	12:33330
CFDU-				
86/ 9	NTIS, PC A14/MF A01			12:33322
CH-				
367/ 87	*See* OEFZS-4386	DE87702402	MN -23	12:34401
CMI-R-				
852260-3	NTIS (US Sales Only), PC A03/MF A01; 1	DE87752129	MN -121	12:33020
CONF-8301119-	(Solar Maximum Mission flare workshop: energetic phenomena on the sun, Greenbelt, MD, USA, 24 Jan 1983)			
	See N-87-19328			12:34010
CONF-840619-	(31. annual meeting of the Society of Nuclear Medicine, Los Angeles, CA, USA, 5-8 Jun 1984)			
	J. Nucl. Med., 25: No. 5, 31(1984)			12:33776
	J. Nucl. Med., 25: No. 5, 31(1984)			12:33777
	J. Nucl. Med., 25: No. 5, 40(1984)			12:33863
	J. Nucl. Med., 25: No. 5, 33(1984)			12:33869
CONF-840872-	(SPIE annual technical symposium, San Diego, CA, USA, 19-24 Aug 1984)			
	Proc. Soc. Photo-Opt. Instrum. Eng., 495: 22-29(1984)			12:34449
CONF-8409392-	(IAEA technical committee meeting on plasma confinement and heating in stellarators, Schloss Ringberg, F.R. Germany, 24-28 Sep 1984)			
Vol.1	*See* EUR-9618-Vol.1	DE87751803	MN -20a	12:34269
Vol.2	*See* EUR-9618-Vol.2	DE87751804	MN -20a	12:34303
CONF-8409396-	(Workshop on Modular Modeling System (MMS), New Orleans, LA, USA, 26-28 Sep 1984)			
Vol.4B	*See* EPRI-CS/NP-3016-Vol.4B	TI87920392	ND -32	12:34420
CONF-841094-	(International workshop on irradiated fuel storage--operating experience and development programs, Toronto, Ontario, Canada, 17-18 Oct 1984)			
6	*See* HEDL-SA-3168-FP	E 1.99: DE87008383	MN -85	12:32521
CONF-850169-	(7. international conference on positron annihilation, New Delhi, India, 6-11 Jan 1985)			
23	*See* BNL-36214	DE87010074	MN -34A	12:34225
CONF-8503105-	(Orbital dynamics and applications to accelerators workshop, Berkeley, CA, USA, 7-12 Mar 1985)			
11	*See* UCRL-92627	E 1.99: DE87008747	MN -34B	12:34025
CONF-850417-	(189. national meeting of the American Chemical Society, Miami, FL, USA, 28 Apr-3 May 1985)			
33	*See* UCRL-92721	E 1.99: DE87008487	MN -78	12:32997
CONF-8504302-	(Technical committee meeting to elaborate procedures and data for the intercomparison of personnel dosimeters, Vienna, Austria, 22-26 Apr 1985)			
	See IAEA-TECDOC-402	DE87702284	MN -37	12:33515
CONF-8505352-	(Joint Czechoslovak-Soviet workshop on current drive in tokamaks, Liblice, Czechoslovakia, 15-17 May 1985)			
	See IPPCZ-254	DE87702303	MN -20	12:34319

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CONF-850699-	(Conference on plasma sciences, Pittsburgh, PA, USA, 3-5 Jun 1985)			
	IEEE Service Center, 445 Hoes Ln., Piscataway, NJ 08854			12:34353
CONF-8506237-	(Photovoltaics and insolation measurements workshop, Vail, CO, USA, 30 Jun-3 Jul 1985)			
	Sol. Cells, 18: 226(Oct 1986)			12:32648
CONF-850734-	(2. international synchrotron radiation instrumentation conference, Stanford, CA, USA, 29 Jul-2 Aug 1985)			
26	*See* UCRL-92410		DE87008752 MN -4	12:33230
CONF-8507152-	(12. international symposium on nuclear electronics, Dubna, USSR, 2-6 Jul 1985)			
	See JINR-D-13-85-793		DE87780145 MN -20	12:34156
CONF-850814-	(Cryogenic engineering conference and international cryogenic materials conference, Boston, MA, USA, 12-16 Aug 1985)			
42	*See* UCRL-93208		DE87008725 MN -20	12:34389
CONF-850839-	(International symposium on antennas and propagation, Kyoto, Japan, 20-22 Aug 1985)			
2	*See* UCRL-92822	E 1.99:	DE87008156 MN -38	12:33420
CONF-850942-	(190. American Chemical Society national meeting, Chicago, IL, USA, 8-13 Sep 1985)			
60	*See* UCRL-92469	E 1.99:	DE87008211 MN -34C	12:34201
CONF-8509227-	(IAEA topical meeting on phase space approach to nuclear dynamics, Trieste, Italy, 30 Sep-4 Oct 1985)			
9	*See* ISN-85-101		DE87751826 MN -34C	12:34191
10	*See* ISN-85-81		DE87751830 MN -34C	12:34190
CONF-8509388-	(Advisory group meeting on potential of low-temperature nuclear heat applications, Wuerenlingen, Switzerland, 9-13 Sep 1985)			
Summ.	*See* IAEA-TECDOC-397		DE87702283 MN -80	12:32741
CONF-8510250-	(Department of Energy (DOE) meterology workshop, Lake Placid, NY, USA, 1-4 Oct 1985)			
	NTIS, PC A11; 3 (GPO Dep.)	E 1.99:	DE87009894 STD -11	12:33654
CONF-8510441-	(24. days of nuclear medicine, Opava, Czechoslovakia, 9-11 Oct 1985)			
Absts.	*See* INIS-mf-10909		DE87702301 MN -48	12:33858
CONF-851115-	(American Nuclear Society winter meeting, San Francisco, CA, USA, 10-15 Nov 1985)			
53	*See* UCRL-92877	E 1.99:	DE87008749 MN -15	12:32594
CONF-8511170-	(Lattice gauge theory: a challenge in large scale computing conference, Wuppertal, F.R. Germany, 5-7 Nov 1985)			
4	*See* CEA-CONF-8314		DE87751806 MN -34D	12:34237
CONF-8511279-	(DGLR symposium: evaluation of man-machine systems - methods and problems, Koeln, F.R. Germany, 14-15 Nov 1985)			
	See DGLR-85-04		DE87751901 MN -41	12:32847
CONF-851209-	(24. IEEE conference on decision and control, Ft. Lauderdale, FL, USA, 11-13 Dec 1985)			
8	*See* UCRL-92372		DE87008756 MN -38	12:33419
CONF-8512127-	(9. international online information meeting, London, UK, 3-5 Dec 1985)			
1	*See* UCRL-93125	E 1.99:	DE87008744 MN -32	12:34452
CONF-860117-	(Los Angeles symposium and exhibition on optical and electro-optical engineering, Los Angeles, CA, USA, 19-24 Jan 1986)			
15	*See* UCRL-93452	E 1.99:	DE87009136 MN -22	12:33633
CONF-8601110-	(SERI photovoltaics safety conference, Lakewood, CO, USA, 16-17 Jan 1986)			
1	*See* BNL-39204	E 1.99:	DE87007144 MN -63	12:32620
CONF-8602110-	(Conference on polycyclic aromatic hydrocarbons and astrophysics, Les Houches, France, 1 Feb 1986, 1 Feb 1986)			
1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE87003377 MN -34B	12:34004
CONF-860366-	(SPIE technical symposium on applications of artificial intelligence, Orlando, FL, USA, 31 Mar 1986, 31 Mar 1986)			
13	*See* UCRL-94380	E 1.99:	DE87009586 MN -21	12:33366
CONF-860396-	(Symposium on the many facets of heavy ion fusion reactions, Argonne, IL, USA, 24-26 Mar 1986)			
	See ANL-PHY-86-1	E 1.99:	DE87010055 MN -34C	12:34153
CONF-8603159-	(Meeting on protection, handling, detection and safety, Grenoble, France, 12-14 Mar 1986)			
2	*See* CEA-CONF-8383		DE87751837 MN -38	12:33328
CONF-860420-	(Fast burst reactor workshop, Albuquerque, NM, USA, 8-10 Apr 1986)			
Vol.1	*See* SAND-87-0098-Vol.1	E 1.99:	DE87009239 STD -80	12:32886
CONF-8604184-	(Symposium on 10 years of uranium beam, Darmstadt, F.R. Germany, 2-4 Apr 1986)			
	See GSI-86-19		DE87751897 MN -34C	12:34155

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CONF-8604318-	(International meeting on radiation chemistry and processing, Marianske Lazne, Czechoslovakia, 21-25 Apr 1986)			
Abstr.	*See* INIS-mf-10889	DE87702194	MN -4	12:33273
CONF-860506-	(International conference on heavy ion nuclear collisions in the Fermi energy domain, Caen, France, 12-16 May 1986)			
12	*See* ISN-86-61	DE87751800	MN -34C	12:34193
13	*See* CRN-PN-86-18	DE87751835	MN -34C	12:34173
14	*See* ISN-86-59	DE87751840	MN -34C	12:34163
CONF-8605145-	(International conference on the physics of phase space, College Park, MD, USA, 20-23 May 1986)			
6	*See* ISN-86-62	DE87751831	MN -34C	12:34194
CONF-8605242-	(Seminar on fission, Habay la Neuve, Belgium, 22-23 May 1986)			
1	*See* LPCC-86-02	DE87751802	MN -34C	12:34157
CONF-8605247-	(Gauge theories and the early universe conference, Erice, Italy, 1 May 1986)			
1-Summ.	*See* FNAL/C-87/35-A	DE87007037	MN -34B	12:34006
CONF-8605257-	(Research co-ordination meeting on isotopic tracer-aided studies of pesticide residues in stored products, London, Canada, 5-9 May 1986)			
	See IAEA-TECDOC-405	DE87702285	MN -48	12:33875
CONF-860602-	(17. rare earth research conference, Hamilton, Ontario, Canada, 8-12 Jun 1986)			
	J. Less-Common Met., 127: 79-85(Jan 1987)			12:33216
CONF-860605-	(13. international symposium on the effects of radiation on materials, Seattle, WA, USA, 23-25 Jun 1986)			
39	*See* HEDL-SA-3400	E 1.99: DE87004086	MN -78	12:32748
CONF-860610-	(American Nuclear Society annual meeting, Reno, NV, USA, 15-20 Jun 1986)			
	Trans. Am. Nucl. Soc., 52: 654-656(1986)			12:32810
	Trans. Am. Nucl. Soc., 52: 656-657(1986)			12:32811
	Trans. Am. Nucl. Soc., 52: 623-625(1986)			12:32887
	Trans. Am. Nucl. Soc., 52: 645-646(1986)			12:32888
	Trans. Am. Nucl. Soc., 52: 646-648(1986)			12:32889
	Trans. Am. Nucl. Soc., 52: 648-649(1986)			12:33009
	Trans. Am. Nucl. Soc., 52: 650-651(1986)			12:33010
CONF-860674-	(17. power modulator symposium, Seattle, WA, USA, 23-25 Jun 1986)			
12	*See* UCRL-94114	DE87009600	MN -38	12:33421
13	*See* UCRL-94212	DE87009617	MN -38	12:33422
CONF-8606114-	(Ice penetration technology workshop, Monterey, CA, USA, 16-19 Jun 1986)			
4	*See* UCRL-95215	E 1.99: DE87009736	MN -38	12:33213
CONF-8606125-	(ASHRAE annual meeting, Portland, OR, USA, 22-25 Jun 1986)			
	ASHRAE Trans., 92: No. 2B, 793-803(1986)			12:33080
	ASHRAE Trans., 92: No. 2B, 328-352(1986)			12:33081
	ASHRAE Trans., 92: No. 2B, 5-18(1986)			12:33082
	ASHRAE Trans., 92: No. 2B, 160-173(1986)			12:33083
	ASHRAE Trans., 92: No. 2B, 174-188(1986)			12:33084
	ASHRAE Trans., 92: No. 2B, 239-257(1986)			12:33085
	ASHRAE Trans., 92: No. 2B, 644-673(1986)			12:33086
	ASHRAE Trans., 92: No. 2B, 804-814(1986)			12:33087
CONF-8606261-	(17. international GIFT seminar on cosmology and particle physics, Peniscola, Spain, 2-7 Jun 1986)			
2-Summ.	*See* FNAL/C-87/35-A	DE87007037	MN -34B	12:34006
CONF-8606294-	(26. Kracow school on theoretical physics, Zakopane, Poland, 1-13 Jun 1986)			
1-Summ.	*See* FNAL/C-87/35-A	DE87007037	MN -34B	12:34006
CONF-8606300-	(High power electron and ion-beam research and technology conference, Osaka, Japan, 9-12 Jun 1986)			
1	*See* UCRL-94882	DE87008482	MN -38	12:34048
CONF-8606301-	(11. All-Union conference on calorimetry and chemical thermodynamics, Novosibirsk, USSR, 17-19 Jun 1986)			
Pt.2-Summs.	*See* INIS-SU-420	DE87780144	MN -4	12:33250
CONF-860701-	(23. international conference on high-energy physics, Berkeley, CA, USA, 16-23 Jul 1986)			
83	*See* CEA-CONF-8775	DE87751811	MN -34D	12:34238
CONF-860736-	(14. SLAC summer institute on particle physics, Stanford, CA, USA, 28 Jul-8 Aug 1986)			
	See SLAC-312	E 1.99: DE87009268	STD -34D	12:34073
14	*See* SLAC-PUB-4253	E 1.99: DE87008325	MN -34D	12:34108
CONF-860761-	(8. international conference on mathematical physics, Marseilles, France, 16-23 Jul 1986)			
2	*See* CEA-CONF-8776	DE87751810	MN -34D	12:34120
CONF-8607113-	(11. international conference on general relativity and gravitation, Stockholm, Sweden, 1 Jul 1986)			
3	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87008239	MN -34B	12:34005

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CONF-860826-	(National meeting of the American Institute of Chemical Engineers, Boston, MA, USA, 24-27 Aug 1986)				
13	*See* UCRL-95079	E 1.99:	DE87010275	MN -22	12:32510
CONF-860880-	(30. SPIE technical symposium on optics and optoelectronic engineering, San Diego, CA, USA, 17-22 Aug 1986)				
51	*See* UCRL-95502		DE87007336	MN -38	12:33214
53	*See* UCRL-94730		DE87009946	MN -34C	12:34046
CONF-8608169-	(14. international cancer congress, Budapest, Hungary, 21-27 Aug 1986)				
Vol.1-Absts.	*See* INIS-mf-10904		DE87702300	MN -48	12:33789
CONF-8608170-	(NATO ASI: the early universe, Victoria, UK, 1 Aug 1986)				
1-Summ.	*See* FNAL/C-87/35-A		DE87007037	MN -34B	12:34006
CONF-8608178-	(3. international conference on computer simulations in brain science, Copenhagen, Denmark, 1 Aug 1986)				
1	*See* LA-UR-87-1275	E 1.99:	DE87008998	MN -48	12:33766
CONF-8608179-	(Annual Illuminating Engineering Society conference, Boston, MA, USA, 16-23 Aug 1986)				
1	*See* LBL-21004	E 1.99:	DE87009155	MN -38	12:33074
CONF-860903-	(IEEE-Industry Applications Society annual meeting, Denver, CO, USA, 28 Sep-2 Oct 1986)				
2	*See* LBL-21884		DE87009150	MN -95c	12:33076
CONF-860908-	(Operability of nuclear power systems in normal and adverse environments meeting, Albuquerque, NM, USA, 29 Sep-3 Oct 1986)				
42	*See* CEA-CONF-8723		DE87751815	MN -78	12:32893
CONF-860922-	(12. international symposium on discharges and electrical insulation in vacuum, Shoresh, Israel, 22-25 Sep 1986)				
1	*See* UCRL-95087		DE87009564	MN -38	12:33423
CONF-860931-	(International conference on reliable fuels for liquid metal reactors, Tucson, AZ, USA, 7-11 Sep 1986)				
19	*See* HEDL-SA-3478-FP	E 1.99:	DE87009514	MN -79b	12:32881
20	*See* HEDL-SA-3477-FP	E 1.99:	DE87009508	MN -79r	12:32806
21	*See* HEDL-SA-3479-FP	E 1.99:	DE87009512	MN -79b	12:32882
CONF-8609163-	(International conference and symposia on unified concepts of many-body problems, Stony Brook, NY, USA, 4-6 Sep 1986)				
10	*See* CEA-CONF-8777		DE87751812	MN -34D	12:34094
CONF-8609174-	(2. Mark II workshop on SLC physics, Tahoe City, CA, USA, 14-17 Sep 1986)				
	See SLAC-306		DE87010325	STD -34D	12:34072
CONF-8609227-	(IAEA specialists meeting on fast reactor cover gas purification, Richland, WA, USA, 24-26 Sep 1986)				
	See IWGFR-61		DE87900693	MN -79a	12:32808
CONF-8609260-	(Federation of Analytical Chemistry and Spectroscopy Societies' annual meeting, St. Louis, MO, USA, 28 Sep-3 Oct 1986)				
1	*See* DP-MS-86-69	E 1.99:	DE87005824	MN -37	12:33625
CONF-8609284-	(Workshop on space technology plasma issues in 2001, Pasadena, CA, USA, 24-26 Sep 1986)				
	See N-87-20055				12:34024
CONF-861007-	(Nuclear science and nuclear power systems symposium, Washington, DC, USA, 29-31 Oct 1986)				
27	*See* LBL-21566		DE87007180	MN -37	12:33612
CONF-861035-	(2. international meeting on simulation methods in nuclear engineering, Montreal, Canada, 14-16 Oct 1986)				
3	*See* CEA-CONF-8761		DE87751814	MN -80	12:32823
CONF-8610135-	(14. water reactor safety information meeting, Gaithersburg, MD, USA, 27-31 Oct 1986)				
61	*See* HEDL-SA-3616-FP	E 1.99:	DE87005475	MN -78	12:32953
62	*See* BNL-NUREG-39412		TI87006905	MN -78	12:32891
CONF-8610196-	(European workshop on few body physics, Rome, Italy, 7-11 Oct 1986)				
	Few-Body Syst., Suppl., 130-139(1986)				12:34204
CONF-8610264-	(2. international seminar on standards and structural analysis is elevated temperature applications for reactor technology, Venice, Italy, 15-17 Oct 1986)				
1	*See* CEA-CONF-8763		DE87751813	MN -80	12:32804
CONF-8610272-	(BVS/NVS joint study-day, Mol, Belgium, 10 Oct 1986)				
	Few-Body Syst., Suppl., 94-103(1986)				12:34203
CONF-861102-	(American Nuclear Society and Atomic Industrial Forum joint meeting, Washington, DC, USA, 16-21 Nov 1986)				
32	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE87004821	MN -78	12:32942
43	*See* DP-MS-86-74	E 1.99:	DE87010203	MN -70	12:32533
45	*See* DP-MS-86-79	E 1.99:	DE87010190	MN -70	12:32534

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CONF-861106-	(IAEA international conference on plasma physics and controlled nuclear fusion research, Kyoto, Japan, 12-19 Nov 1986)			
26	*See* UCRL-94435	E 1.99: DE87009562	MN -20	12:34341
CONF-861114-	(9. international conference on application of accelerators in research and industry, Denton, TX, USA, 10-12 Nov 1986)			
55-Rev.1	*See* UCRL-94811-Rev.1	E 1.99: DE87009945	MN -34A	12:34047
CONF-861183-	(Conference on electron beam melting and refining state of the art 1986, Reno, NV, USA, 2-4 Nov 1986)			
2	*See* UCRL-94868	E 1.99: DE87009568	MN -21	12:34390
CONF-861185-	(Reduced Enrichment for Research and Test Reactors (RERTR) program international meeting, Gatlinburg, TN, USA, 3-6 Nov 1986)			
13	NTIS, PC A02; 3	DE87008583	MN -80	12:32876
CONF-8611120-	(Seminar on BWR corrosion, chemistry, and radiation control, Palo Alto, CA, USA, 10-12 Nov 1986)			
2-Summ.	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87004755	MN -78	12:32746
CONF-8611150-	(International conference on non-military radiation emergencies, Washington, DC, USA, 19-21 Nov 1986)			
2	*See* BNL-39591	E 1.99: DE87010450	MN -41	12:33022
CONF-8611154-	(Boulder damage symposium, Boulder, CO, USA, 3-5 Nov 1986)			
1	*See* LA-UR-86-3996	E 1.99: DE87002897	MN -4	12:33206
CONF-8611158-	(JINA '86: Institute for Electrical and Electronics Engineers meeting, Nice, France, 4-6 Nov 1986)			
1	*See* UCRL-95331	E 1.99: DE87010278	MN -32	12:34439
CONF-861204-	(4. Miami international symposium on multi-phase transport and particulate phenomena, Miami Beach, FL, USA, 15-17 Dec 1986)			
8	*See* EGG-M-31086	DE87009402	MN -78	12:32874
CONF-861207-	(Materials Research Society fall meeting, Boston, MA, USA, 1-5 Dec 1986)			
105	*See* DP-MS-86-101	E 1.99: DE87010204	MN -70	12:32535
106	NTIS, PC A02/MF 01; 1 (GPO Dep.)	E 1.99: DE87010376	MN -25	12:33196
CONF-861211-	(American Society of Mechanical Engineers winter meeting, Anaheim, CA, USA, 7-12 Dec 1986)			
26	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87004820	MN -20	12:34356
CONF-861220-	(American Geophysical Union fall meeting, San Francisco, CA, USA, 8-12 Dec 1986)			
6	*See* LBL-23116	E 1.99: DE87009633	MN -11	12:32682
CONF-861262-	(SFEN conference on fast reactors and the startup of superphenix, Paris, France, 10-11 Dec 1986)			
9	*See* CEA-CONF-8738	DE87751816	MN -79	12:32803
CONF-861271-	(5. Particle Therapy Cooperative Group (PTCOG) meeting and international workshop on biomedical accelerators, Berkeley, CA, USA, 1-2 Dec 1986)			
	See LBL-22962	E 1.99: DE87009281	STD -48	12:33861
CONF-861280-	(Pacific northwest fish culture conference, Springfield, OR, USA, 2-4 Dec 1986)			
Exc.	*See* DOE/BP-816	E 1.99: DE87009907	MN -11	12:33873
CONF-870101-	(American Society of Heating, Refrigerating, and Air-Conditioning Engineers meeting, New York, NY, USA, 18-21 Jan 1987)			
11	*See* LBL-18838	E 1.99: DE87009623	MN -59B	12:33073
13	*See* LBL-21576	DE87007609	MN -95d	12:33075
CONF-870102-	(4. symposium on space nuclear power systems, Albuquerque, NM, USA, 12-16 Jan 1987)			
22	*See* UCRL-95301	E 1.99: DE87008726	MN -33A	12:32998
CONF-870121-	(Meeting of the Division of Particles and Fields of the American Physical Society, Salt Lake City, UT, USA, 14-17 Jan 1987)			
1	*See* LBL-22841	E 1.99: DE87007610	MN -34D	12:34107
2	*See* FNAL/C-87/37-E	E 1.99: DE87007960	MN -34D	12:34076
5	*See* LA-UR-87-1196	E 1.99: DE87008990	MN -34C	12:34086
CONF-870142-	(5. international conference on valence fluctuations, Bangalore, India, 5-9 Jan 1987)			
12	*See* LA-UR-87-1715	E 1.99: DE87010127	MN -25	12:33160
CONF-870153-	(25. international winter meeting on nuclear physics, Bormio, Italy, 19-24 Jan 1987)			
2	*See* LBL-23228	E 1.99: DE87009553	MN -34C	12:34200
CONF-870164-	(7. Moriond workshop: searches for new and exotic phenomena, Les Arcs, France, 1 Jan 1987)			
1	*See* LA-UR-87-1104	E 1.99: DE87007504	MN -34C	12:34117
3	*See* LA-UR-87-1348	E 1.99: DE87009002	MN -34C	12:34087
CONF-870165-	(Workshop on electronuclear physics with internal targets, Stanford, CA, USA, 5-8 Jan 1987)			
6	*See* UCRL-96589	E 1.99: DE87010270	MN -34C	12:33615
CONF-870172-	(11. annual conference on composites, Cocoa Beach, FL, USA, 18-23 Jan 1987)			
1	*See* N-87-18784			12:33186

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CONF-870203-	(Institute of Electrical and Electronic Engineers/ Power Engineering Society winter meeting, New Orleans, LA, USA, 1-6 Feb 1987)			
3	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE87006999	MN -38	12:33016
CONF-870249-	(Computing high energy physics, Pacific Grove, CA, USA, 2-6 Feb 1987)			
5	*See* FNAL/C-87/48	E 1.99: DE87007959	MN -34D	12:34071
CONF-870269-	(Society of Photo-Optical Instrumentation Engineers' medical imaging I conference, Newport Beach, CA, USA, 1-6 Feb 1987)			
1	*See* LBL-21800	E 1.99: DE87006935	MN -38	12:33859
CONF-870286-	(Symposium on plant membranes, Park City, UT, USA, 9-13 Feb 1987)			
1	*See* BNL-39553	E 1.99: DE87008718	MN -48	12:32622
CONF-870291-	(Environmental considerations associated with siting, constructing, and operating a special isotope separation plant at INEL, Idaho Falls, ID, USA, 24-26 Feb 1987)			
Vol.1	*See* DOE/ID-10164-Vol.1	E 1.99: DE87009727	MN -22	12:32582
Vol.2	*See* DOE/ID-10164-Vol.2	E 1.99: DE87009728	MN -22	12:32583
CONF-870301-	(International topical meeting on remote systems and robotics in hostile environments, Pasco, WA, USA, 29 Mar-2 Apr 1987)			
21	*See* HEDL-SA-3544-FP	DE87008392	MN -38	12:33337
CONF-870302-	(Particle accelerator conference, Washington, DC, USA, 16-19 Mar 1987)			
82	*See* FNAL/C-87/49	DE87007958	MN -28	12:33455
87	*See* BNL-39404	E 1.99: DE87007632	MN -28	12:33510
121	*See* SLAC-PUB-4218	E 1.99: DE87008874	MN -28	12:33495
132	*See* BNL-39613	E 1.99: DE87008714	MN -28	12:33454
CONF-870306-	(Waste management '87, Tucson, AZ, USA, 1-5 Mar 1987)			
12-Summ.	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87003460	MN -78	12:32943
45	*See* EGG-M-28786	E 1.99: DE87009417	MN -70B	12:32539
46	NTIS, PC A02; 3	DE87009667	MN -70B	12:32527
49	*See* EGG-M-28686	DE87009399	MN -78	12:33335
CONF-870385-	(SPIE conference on growth of compound semiconductors, Bay Point, FL, USA, 22-27 Mar 1987)			
9	*See* LA-UR-87-1452	DE87009012	MN -38	12:33414
CONF-870388-	(International conference on metallurgical coatings, San Diego, CA, USA, 23-27 Mar 1987)			
7	*See* GA-A-18815	E 1.99: DE87010085	MN -25	12:33178
8	*See* N-87-18668			12:33185
CONF-8703109-	(3. annual review of progress in applied computational electromagnetics, Monterey, CA, USA, 24-26 Mar 1987)			
1	*See* UCRL-96440	E 1.99: DE87008488	MN -38	12:33427
CONF-8703116-	(US-Japan seminar on interactions of highly ionized atoms produced in heavy-ion collisions, Kobe, Japan, 1 Mar 1987)			
4	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87009819	MN -34A	12:34037
CONF-8703121-	(Telemark IV - neutrino mass and neutrino astrophysics, Ashland, WI, USA, 16-18 Mar 1987)			
1	*See* FNAL/C-87/65-E	E 1.99: DE87009435	MN -34B	12:34007
CONF-8703122-	(Atomic industrial forum, Boston, MA, USA, 16 Mar 1987)			
1	*See* EGG-M-09287	E 1.99: DE87009267	MN -70B	12:32595
CONF-8703134-	(JANNAF propulsion systems hazards subcommittee, Arsenal, AL, USA, 30 Mar-3 Apr 1987)			
2	*See* SAND-86-2589C	E 1.99: DE87007849	MN -38	12:33325
CONF-870405-	(Radiation protection and shielding conference, Knoxville, TN, USA, 22-24 Apr 1987)			
6	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87005693	MN -79	12:32805
CONF-870406-	(7. symposium on training of nuclear facility personnel, Orlando, FL, USA, 27-30 Apr 1987)			
1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87006208	MN -78	12:32745
CONF-870410-	(193. national meeting of the American Chemical Society, Denver, CO, USA, 5-10 Apr 1987)			
17	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87007561	MN -34C	12:34172
19	NTIS, PC A02; 3	DE87009126	MN -34C	12:34167
CONF-870418-	(Topical meeting on anticipated and abnormal transients in nuclear power plants, Atlanta, GA, USA, 12-15 Apr 1987)			
2	NTIS, PC A02; 3	DE87006378	MN -78	12:32945
3	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87007000	MN -79	12:32946
CONF-870424-	(American Nuclear Society international meeting on advances in reactor physics, mathematics and computation, Paris, France, 27-30 Apr 1987)			
10	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87006991	MN -79p	12:32947
13	*See* EGG-M-32386	E 1.99: DE87009722	MN -80	12:32950
CONF-870429-	(6. annual conference on incineration of mixed and low-level radioactive wastes, St. Charles, IL, USA, 22-25 Apr 1987)			
1	*See* DP-MS-86-171	E 1.99: DE87010070	MN -70B	12:32537

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CONF-870430-	(International conference on methods and applications of radioanalytical chemistry, Kona, HI, USA, 5-10 Apr 1987)			
6	*See* UCRL-94995	E 1.99: DE87009742	MN -11	12:33753
7	*See* LBL-23367	E 1.99: DE87010258	MN -4	12:33320
CONF-870438-	(Spring meeting of the Materials Research Society, Anaheim, CA, USA, 21-25 Apr 1987)			
17	*See* SAND-86-2910C	E 1.99: DE87010429	MN -25	12:33188
CONF-870479-	(AIAA/ASME structural dynamics and materials conference, Monterey, CA, USA, 6-8 Apr 1987)			
2	*See* SAND-86-2101C	E 1.99: DE87005884	MN -38	12:33344
CONF-870482-	(14. Department of Energy compatibility, aging and service life conference, Amarillo, TX, USA, 28-30 Apr 1987)			
4	*See* UCRL-96127	E 1.99: DE87007323	MN -38	12:33171
5	*See* MLM-3434(OP)	E 1.99: DE87009201	MN -37	12:33645
CONF-870484-	(Western states section/the Combustion Institute spring meeting, Provo, UT, USA, 6-7 Apr 1987)			
3	*See* UCRL-96438	E 1.99: DE87008842	MN -96	12:33134
CONF-870487-	(ARRAY conference, Montreal, Canada, 26-29 Apr 1987)			
1	*See* UCRL-95835	E 1.99: DE87006686	MN -38	12:34252
CONF-870498-	(7. tandem conference, Berlin, F.R. Germany, 6-10 Apr 1987)			
7	NTIS, PC A03; 3	DE87008802	MN -34A	12:34036
CONF-8704107-	(Telemark IV, Ashland, WI, USA, 23-25 Apr 1987)			
1	*See* LA-UR-87-1255	E 1.99: DE87008995	MN -34B	12:34105
CONF-8704110-	(5. geothermal program review, Washington, DC, USA, 14-15 Apr 1987)			
4	*See* LBL-23230	DE87009619	MN -66a	12:32683
7	*See* SAND-87-1253C	DE87009834	MN -66	12:32673
8	*See* SAND-87-0921C	E 1.99: DE87010036	MN -66	12:33987
CONF-8704112-	(4. international symposium on accelerator mass spectrometry, Ontario, Canada, 27-30 Apr 1987)			
1	*See* LA-UR-87-1397	E 1.99: DE87009008	MN -34B	12:34008
3	*See* DOE/ER/40048-194	E 1.99: DE87009710	MN -34C	12:33511
4	*See* DOE/ER/40048-193	E 1.99: DE87009709	MN -34C	12:33977
5	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87009829	MN -34C	12:34162
CONF-8704120-	(Entrepreneurial management: new technology and new market development conference, San Luis Obispo, CA, USA, 3-4 Apr 1987)			
1	*See* LBL-23255	E 1.99: DE87010284	MN -25	12:33029
CONF-8704121-	(Ingres User Association meeting, San Francisco, CA, USA, 26-29 Apr 1987)			
1	*See* UCRL-96222	E 1.99: DE87010269	MN -32	12:34453
CONF-8704122-	(Smoke/obscurants symposium, Laurel, MD, USA, 21-23 Apr 1987)			
1	*See* LA-UR-87-1294	E 1.99: DE87009000	MN -34	12:34226
CONF-8704123-	(Conference on radon, radium, and other radioactivity in ground water: hydrogeologic impact and application to indoor airborne contamination, Somerset, NJ, USA, 7-9 Apr 1987)			
1	*See* LBL-23301	E 1.99: DE87010254	MN -11	12:33752
CONF-8704125-	(3. international conference on carcinogenic and mutagenic N-substituted aryl compounds, Dearborn, MI, USA, 25-28 Apr 1987)			
1	NTIS, PC A02; 3	DE87010392	MN -48	12:33943
CONF-8704126-	(VIM conference, Ottawa, Canada, 27 Apr 1987)			
1	*See* BDX-613-3758	E 1.99: DE87009391	MN -32	12:34408
CONF-8704127-	(Asia Pacific symposium on surface physics, Shanghai, China, 14-17 Apr 1987)			
1	*See* LBL-23258	E 1.99: DE87009551	MN -34A	12:34228
CONF-8704128-	(Conference on residual stress in design, process, and materials, Cincinnati, OH, USA, 27-29 Apr 1987)			
1	*See* DP-MS-86-166	DE87010186	MN -25	12:33143
CONF-8704129-	(Upper great lakes governors' conference on forestry, Minneapolis, MN, USA, 9-10 Apr 1987)			
1	NTIS, PC A02/MF 01 (GPO Dep.)	E 1.99: DE87009821	MN -11	12:33714
CONF-8704130-	(Conference on oxygen radicals and tissue injury, Augusta, MI, USA, 27-29 Apr 1987)			
1	*See* BNL-39748	E 1.99: DE87010064	MN -48	12:33894
CONF-870501-	(6. ASTM-Euratom symposium on reactor dosimetry, Jackson Hole, WY, USA, 31 May-5 Jun 1987)			
2	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87009675	MN -78	12:32760
CONF-870516-	(5. international symposium on gaseous dielectrics, Knoxville, TN, USA, 3-7 May 1987)			
6	NTIS, PC A02; 3	DE87008825	MN -38	12:33413
CONF-870519-	(9. annual meeting of the European Safeguards Research and Development Association: safeguards and nuclear material management, London, UK, 12-14 May 1987)			
2	*See* LA-UR-87-1387	E 1.99: DE87009007	MN -15	12:32592

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CONF-870528-	(19. IEEE photovoltaic specialists conference, New Orleans, LA, USA, 4-8 May 1987)			
14	*See* SAND-87-1214C	TI87009498	ND -63	12:32637
16	*See* SAND-87-1113C	DE87008967	MN -63d	12:32652
CONF-870552-	(5. conference on real-time computer applications in nuclear particle and plasma physics, San Francisco, CA, USA, 11-15 May 1987)			
3	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87009664	MN -20b	12:34357
4	*See* UCRL-96151	E 1.99: DE87010272	MN -32	12:34443
5	*See* LA-UR-87-1825	E 1.99: DE87010140	MN -32	12:34428
6	*See* BNL-39806	E 1.99: DE87010445	MN -34	12:34410
7	*See* UCRL-96628	E 1.99: DE87009943	MN -32	12:34444
8	*See* BNL-39808	E 1.99: DE87010444	MN -34	12:34412
9	*See* BNL-39810	E 1.99: DE87010442	MN -32	12:34414
10	*See* BNL-39809	E 1.99: DE87010443	MN -32	12:34413
11	*See* BNL-39807	E 1.99: DE87010446	MN -34	12:34411
CONF-870556-	(33. annual international instrumentation symposium, Las Vegas, NV, USA, 3-8 May 1987)			
1	*See* SAND-86-2604C	E 1.99: DE87003498	MN -37	12:33345
CONF-870567-	(2. international conference on supercomputing, San Francisco, CA, USA, 4-7 May 1987)			
2	NTIS, PC A02; 3	DE87007666	MN -38	12:33330
CONF-870570-	(7. topical conference on applications of radio-frequency power to plasmas, Kissimmee, FL, USA, 4-6 May 1987)			
3	*See* UCRL-96562	E 1.99: DE87009580	MN -20a	12:34342
4	NTIS, PC A02; 3	DE87009507	MN -20	12:34358
5	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87009669	MN -20	12:34359
6	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87009670	MN -20	12:34261
7	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87009666	MN -20	12:34262
CONF-870575-	(39. National Aerospace and Electronics (NAECON) conference, Dayton, OH, USA, 18-22 May 1987)			
1	*See* SAND-86-2719C	DE87006710	MN -37	12:33416
2	*See* SAND-87-0446C	DE87006706	MN -37	12:33622
CONF-870584-	(Technical symposium southeast on optics, electro-optics and sensors, Orlando, FL, USA, 17-22 May 1987)			
5	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87009676	MN -38	12:33331
CONF-870591-	(Goddard conference on space applications of artificial intelligence and robotics, Greenbelt, MD, USA, 14 May 1987)			
1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87008585	MN -38	12:33332
2	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87008594	MN -38	12:33333
3	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87009121	MN -86	12:32512
CONF-870598-	(4. conference on utility experience in reactor noise analysis, Hartford, CT, USA, 12-14 May 1987)			
1-Abst.	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87009830	MN -80	12:32829
CONF-8705103-	(Fossil energy materials program conference, Oak Ridge, TN, USA, 19-21 May 1987)			
4	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87010019	MN -114	12:33139
CONF-8705104-	(Conference on the incineration of mixed and LLW, Chicago, IL, USA, 1 May 1987)			
1	*See* EGG-M-09187	E 1.99: DE87009731	MN -70B	12:32538
CONF-8705105-	(1. CODATA workshop on nucleic acid and protein sequencing data, Gaithersburg, MD, USA, 3-6 May 1987)			
1	*See* LA-UR-87-1791	E 1.99: DE87010138	MN -32	12:34450
2	*See* LA-UR-87-1789	E 1.99: DE87010137	MN -48	12:33768
CONF-8705106-	(International workshop on micro and macroscopic approaches to detonation, Megeve, France, 31 May-6 Jun 1987)			
1	*See* SAND-87-0883C	E 1.99: DE87009836	MN -45	12:33647
2	*See* LA-UR-87-1786	E 1.99: DE87010136	MN -45	12:33643
CONF-8705109-	(IMPACT '87, Bremen, F.R. Germany, 18-21 May 1987)			
1	*See* LA-UR-87-1479	E 1.99: DE87010098	MN -25	12:33159
2	*See* LA-UR-87-1478	E 1.99: DE87010097	MN -25	12:33158
3-Rev.1	*See* UCRL-93703-Rev.1	E 1.99: DE87008471	MN -25	12:33170
4	*See* UCRL-96621	E 1.99: DE87009848	MN -35	12:33215
CONF-8705114-	(35. conference on mass spectrometry and applied topics, Denver, CO, USA, 24-29 May 1987)			
1	*See* LA-UR-87-1781	E 1.99: DE87010135	MN -4	12:33226
CONF-8705115-	(Effects of soil characteristics on corrosion symposium, Cincinnati, OH, USA, 12 May 1987)			
1	*See* DP-MS-86-104	E 1.99: DE87010196	MN -25	12:32536
CONF-870601-	(Annual meeting of the American Nuclear Society, Dallas, TX, USA, 7-12 Jun 1987)			
1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE86014691	MN -86	12:32513
2	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87004250	MN -34C	12:34213
3	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87004268	MN -34C	12:34181
5	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87004251	MN -34C	12:34214
6	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87004619	MN -34C	12:34185
7	*See* LA-UR-87-49	E 1.99: DE87005118	MN -34C	12:34182
8	*See* LA-UR-87-48	E 1.99: DE87005119	MN -34C	12:32827

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10	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87005720	MN -34C	12:32581
16	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87010425	MN -11	12:33718
CONF-870610-	(5. national synchrotron radiation instrumentation conference, Madison, WI, USA, 21-25 Jun 1987)			
1	*See* BNL-39793	E 1.99: DE87010451	MN -41	12:33895
CONF-870620-	(American Society of Heating, Refrigerating and Air-Conditioning Engineers meeting, Nashville, TN, USA, 28 Jun-2 Jul 1987)			
4	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE87009027	MN -95d	12:33057
5	*See* LA-UR-87-1835	E 1.99: DE87010096	MN -41	12:32511
CONF-870622-	(19. fluid dynamics, plasma dynamics, and laser conference, Honolulu, HI, USA, 8-10 Jun 1987)			
2	*See* SAND-87-0572C	DE87006898	MN -38	12:33381
CONF-870623-	(22. AIAA thermophysics conference, Honolulu, HI, USA, 8-10 Jun 1987)			
4	*See* SAND-86-2646C	E 1.99: DE87009543	MN -38	12:33209
7	*See* N-87-18786			12:33380
CONF-870625-	(Rock mechanics meeting, Tucson, AZ, USA, 29 Jun-1 Jul 1987)			
14	*See* UCRL-95568	E 1.99: DE87010273	MN -70	12:32579
CONF-870636-	(5. national congress on pressure vessels and piping, San Diego, CA, USA, 28 Jun-2 Jul 1987)			
7	*See* EGG-M-16486	E 1.99: DE87009394	MN -80	12:32830
8	*See* BNL-NUREG-39596	E 1.99: DE87008719	MN -80	12:32892
9	*See* EGG-M-31586	DE87009397	MN -80	12:32831
11	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87008795	MN -25	12:33138
CONF-870637-	(Summer meeting of the American Society of Mechanical Engineers, Cincinnati, OH, USA, 14-18 Jun 1987)			
3	*See* SAND-87-0505C	E 1.99: DE87007084	MN -38	12:33389
CONF-870655-	(Antennas and Propagation Society symposium, Blacksburg, VA, USA, 15-19 Jun 1987)			
1	*See* SAND-86-2785C	E 1.99: DE87003032	MN -38	12:33417
3	*See* UCRL-96274	DE87007055	MN -38	12:33426
4	*See* UCRL-95872	E 1.99: DE87007324	MN -38	12:33424
CONF-870656-	(6. Institute of Electrical and Electronic Engineers pulsed power conference, Arlington, VA, USA, 29 Jun-1 Jul 1987)			
1	*See* SAND-87-0140C	E 1.99: DE87005530	MN -21	12:34385
CONF-870665-	(Society for Experimental Mechanics spring meeting, Houston, TX, USA, 14-19 Jun 1987)			
4	*See* SAND-87-0401C	DE87006126	MN -38	12:33347
5	*See* SAND-87-0525C	E 1.99: DE87007085	MN -38	12:33390
CONF-870668-	(3. international conference of the Groupe de Travail de Pyrotechnic Spatiale and 12. international pyrotechnics seminar, Paris, France, 8-12 Jun 1987)			
2	*See* SAND-86-1651C	E 1.99: DE87005843	MN -38	12:33646
4	*See* SAND-86-1652C	E 1.99: DE87008643	MN -38	12:33324
CONF-870694-	(American control conference, Minneapolis, MN, USA, 10-12 Jun 1987)			
1	*See* BNL-39536	DE87008199	MN -38	12:34409
CONF-870695-	(80. annual meeting of the Air Pollution Control Association, New York, NY, USA, 1 Jun 1987)			
4	*See* UCRL-96658	E 1.99: DE87010335	MN -41	12:33951
CONF-8706107-	(Workshop on international exchange and movement of engineers, Washington, DC, USA, 29 Jun 1987)			
1	*See* SAND-87-1347C	E 1.99: DE87009730	MN -13	12:34402
CONF-8706109-	(1. national corn utilization conference, St. Louis, MO, USA, 11-12 Jun 1987)			
1	NTIS, PC A02/MF 01; 1 (GPO Dep.)	E 1.99: DE87010403	MN -61B	12:32624
CONF-8706110-	(5. international conference on numerical methods for thermal problems, Montreal, Canada, 29 Jun-3 Jul 1987)			
1	*See* SAND-87-0132C	E 1.99: DE87009298	MN -34	12:32578
CONF-8706114-	(Annual workshop on robotics and expert systems, Pittsburgh, PA, USA, 4-5 Jun 1987)			
1	NTIS, PC A02/MF 01; 1 (GPO Dep.)	E 1.99: DE87007668	MN -32	12:34416
CONF-870712-	(Numerical methods in laminar and turbulent flow, Montreal, Quebec, Canada, 6-10 Jul 1987)			
1	*See* LA-UR-87-439	E 1.99: DE87006056	MN -32	12:34068
3	*See* LBL-23278	E 1.99: DE87009625	MN -25	12:34069
CONF-870723-	(18. international conference on phenomena in ionized gases, Swansea, UK, 13-17 Jul 1987)			
1	*See* LA-UR-87-150	DE87005105	MN -34	12:34045
CONF-870724-	(24. annual conference on nuclear and space radiation in electronics, Snowmass, CO, USA, 28-31 Jul 1987)			
5	*See* SAND-87-0361C	DE87005856	MN -25	12:33210
9	*See* SAND-87-0299C	DE87005857	MN -37	12:33621
CONF-870725-	(22. annual meeting of the Microbeam Analysis Society, Kailua-Kona, HI, USA, 13-17 Jul 1987)			
1	*See* LA-UR-87-214	E 1.99: DE87005099	MN -25	12:33207
4	*See* UCRL-96006	E 1.99: DE87005816	MN -25	12:33425
6	*See* SAND-87-0260C	E 1.99: DE87006133	MN -34A	12:34229
7	*See* UCRL-95935	E 1.99: DE87008472	MN -34	12:34441

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CONF-870733-	(Pacific workshop and meeting on analytical electron microscopy, Kona, HI, USA, 12-17 Jul 1987)				
2	*See* LBL-22924	E 1.99:	DE87007599	MN -34A	12:34227
CONF-870734-	(American Association for Artificial Intelligence meeting, Seattle, WA, USA, 13-17 Jul 1987)				
1	*See* SAND-87-0364C		DE87006127	MN -32	12:34434
CONF-870737-	(16. shock tube symposium, Aachen, F.R. Germany, 26-30 Jul 1987)				
1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87006351	MN -4	12:33323
CONF-870738-	(ACM SIGGRAPH conference, Anaheim, CA, USA, 27-31 Jul 1987)				
1	*See* UCRL-95948		DE87007054	MN -13	12:34442
2-Rev.1	*See* UCRL-95910-Rev.1		DE87009618	MN -32	12:34440
CONF-870743-	(Carnahan conference on security technology, Atlanta, GA, USA, 15-17 Jul 1987)				
3	*See* SAND-86-2560C	E 1.99:	DE87008524	MN -15	12:32593
CONF-870750-	(CAR '87: international symposium on Computer Assisted Radiology, Berlin, F.R. Germany, 1-4 Jul 1987)				
1	*See* LBL-21874	E 1.99:	DE87007612	MN -48	12:33860
CORR-					
87-0046-Del.Ver.	NTIS MF A01; 2 (GPO Dep.)	E 1.99:	DE87006288	MN -80	12:32948
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85-02	NTIS (US Sales Only), PC A03/MF A01		DE87751823	MN -34D	12:34095
85-05	NTIS (US Sales Only), PC A02/MF A01		DE87751825	MN -34D	12:34096
86-02	NTIS (US Sales Only), PC A02/MF A01		DE87751820	MN -34D	12:34097
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86-18	NTIS (US Sales Only), PC A02/MF A01		DE87751835	MN -34C	12:34173
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86/ 10G	NTIS (US Sales Only), PC A04/MF A01		DE87702258	MN -41	12:32949
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85-04	NTIS (US Sales Only), PC A13/MF A01		DE87751901	MN -41	12:32847
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86/ 7/ SP	NTIS, PC A12/MF A01; 1 (GPO Dep.)	E 1.99:	DE86000284	STD -122	12:32480
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717	NTIS, PC A02; 3		DE87010347	MN -11	12:33674
725	NTIS, PC A14; 3		DE87009928	MN -11	12:33756
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798	NTIS, PC A03; 3		DE87010554	MN -95	12:33045
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DOE/BP/39461-T1	NTIS, PC A10/MF A01; 1 (GPO Dep.)	E 1.99: DE87009902	MN -11	12:33763
DOE/BP/62775-1	NTIS, PC A06/MF A01; 1 (GPO Dep.)	E 1.99: DE87009911	MN -11	12:33724
DOE/BP/63365-1	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99: DE87009912	MN -11	12:32619
DOE/BP/64321-1	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE87009901	MN -11	12:33764
DOE/CE/15262-T2	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87009628	MN -38	12:33334
DOE/CE/27460-T25	ACEEE, 1001 Conn. Ave., NW, Suite 535, Washington, DC 20036	TI87005148	ND -95d	12:33067
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DOE/CE/63485-T4	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87010229	MN -95	12:33062
DOE/CE/64861-T1	NTIS, PC A07/MF A01; 1 (GPO Dep.)	E 1.99: DE87010222	MN -95	12:33033
DOE/CE/89008-T1	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE87005965	MN -63b	12:32625
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DOE/DP/40124-1	NTIS MF A01; 2 (GPO Dep.)	E 1.99: DE87008914	MN -21	12:34360
DOE/EI/19924-T1	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE87009959	MN -98	12:32492
DOE/EIA-0130(87/ 03)	NTIS, PC A08/MF A01 - GPO; 1 (GPO Dep.)	E 1.99: DE87010576	MN -98C	12:32499
0226(87/ 01)	NTIS, PC A03/MF A01 - GPO; 1 (GPO Dep.)	E 1.99: DE87008982	MN -98E	12:33047
0333(87)	NTIS, PC A03/MF A01 - GPO; 1 (GPO Dep.)	E 1.99: DE87010488	MN -98A	12:32475
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0397(86/ 4Q)	NTIS, PC A15/MF A01 - GPO; 1 (GPO Dep.)	E 1.99: DE87008981	MN -98E	12:33048
DOE/EIS-0125-Vol.1	NTIS, PC A14/MF A01; 1 (GPO Dep.)	E 1.99: DE87010349	MN -11	12:32698
0125-Vol.2	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87010350	MN -11	12:32699
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DOE/ER/04207-19	NTIS, PC A05/MF A01; 1 (GPO Dep.)	E 1.99: DE87007767	MN -78	12:32877
DOE/ER/10770-8	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87009853	MN -80	12:32878
DOE/ER/10946-T1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87010515	MN -4	12:33222
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DOE/ER/13261-1	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE87010086	MN -4	12:32628
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DOE/ER/13446-2	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE87009346	MN -38	12:33748
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DOE/ER/13607-1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87008432	MN -38	12:33990
DOE/ER/13613-7	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87010303	MN -4	12:33223
DOE/ER/13614-1	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87009648	MN -48	12:32631
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DOE/ER/25026-4	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99: DE87010571	MN -32	12:34419

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DOE/ER/40048-193	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009709	MN -34C	12:33977
194	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009710	MN -34C	12:33511
DOE/ER/40210-2	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99:	DE87007750	MN -34C	12:34168
DOE/ER/40315-136	NTIS, PC AO8/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009764	MN -34C	12:34074
139	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009766	MN -34C	12:34075
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DOE/ER/45114-3	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010701	MN -25	12:33197
DOE/ER/45116-T2	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010246	MN -25	12:33141
DOE/ER/45220-T2	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009831	MN -94cc	12:33017
DOE/ER/45247-1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010481	MN -4	12:33054
DOE/ER/45253-1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010083	MN -25	12:33142
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DOE/ER/53222-94	NTIS, PC A07; 3		DE87010238	STD -20g	12:34264
DOE/ER/53236-6	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009655	MN -20g	12:34265
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DOE/ER/60220-10	NTIS, PC A05/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010231	MN -48	12:33719
DOE/ER/60402-2	NTIS, PC A06/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009703	STD -48	12:33898
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DOE/ET/10815-119	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010032	MN -112	12:33052
DOE/ET/13543-2291	NTIS, PC A11/MF A01; 1 (GPO Dep.)	E 1.99:	DE87001089	STD -101	12:32700
2316-Vol.1	NTIS, PC A16/MF A01; 1 (GPO Dep.)	E 1.99:	DE87001090	STD -101	12:32701
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DOE/EV/04322-T5	NTIS, PC A03; 3		DE87008641	MN -48	12:33901
DOE/EV/04746-24	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009889	MN -48	12:33944
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DOE/FE-0085	NTIS, PC A04/MF A01 (GPO Dep.)	E 1.99:	DE87009793	MN -105	12:32702
DOE/FE/60177-2348	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010656	STD -123	12:32502
DOE/ID-10164-Vol.1	NTIS, PC A08/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009727	MN -22	12:32582
10164-Vol.2	NTIS MF A01; 2 (GPO Dep.)	E 1.99:	DE87009728	MN -22	12:32583
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DOE/ID/12607-T1	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010181	MN -66a	12:32672

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1012-125-Vol.7	NTIS, PC A05/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009233	MN -63b	12:32633
DOE/MC/20422-					
2337	NTIS, PC A06/MF A01; 1 (GPO Dep.)	E 1.99:	DE87006476	STD -132	12:32498
DOE/MC/22012-					
2310	NTIS, PC A06/MF A01; 1 (GPO Dep.)	E 1.99:	DE87001087	STD -111	12:32467
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86/ 0235	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE86006599	STD -103	12:32472
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87/ 0253	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE87001049	STD -122	12:32484
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268	NTIS (US Sales Only), PC A04/MF A01	DE87702309	MN -34D	12:34329
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1301	NTIS, PC A08/MF A01; 1 (GPO Dep.)	E 1.99: DE87010917	MN -109	12:33251
ISN-				
85-81	NTIS (US Sales Only), PC A02/MF A01	DE87751830	MN -34C	12:34190
85-101	NTIS (US Sales Only), PC A02/MF A01	DE87751826	MN -34C	12:34191
86-58	NTIS (US Sales Only), PC A03/MF A01	DE87751817	MN -34C	12:34192
86-59	NTIS (US Sales Only), PC A02/MF A01	DE87751840	MN -34C	12:34163
86-61	NTIS (US Sales Only), PC A02/MF A01	DE87751800	MN -34C	12:34193
86-62	NTIS (US Sales Only), PC A02/MF A01	DE87751831	MN -34C	12:34194
86-65	NTIS (US Sales Only), PC A02/MF A01	DE87751832	MN -34C	12:34195
ISN-RA-				
1984-85	NTIS (US Sales Only), PC A10/MF A01	DE87751829	MN -34C	12:34196
ITEF-				
45(1986)	NTIS (US Sales Only), PC A02/MF A01	DE87702310	MN -37	12:33531
52(1985)	NTIS (US Sales Only), PC A02/MF A01	DE87702311	MN -4	12:33252
56(1986)	NTIS (US Sales Only), PC A03/MF A01	DE87702312	MN -34D	12:34124
63(1986)	NTIS (US Sales Only), PC A02/MF A01	DE87702313	MN -28	12:33458
75(1986)	NTIS (US Sales Only), PC A03/MF A01	DE87702314	MN -37	12:33532

Report Number	Availability Source	File Number	Distribution Category	Abstract Number
101(1986)	NTIS (US Sales Only), PC A02/MF A01	DE87702315	MN -28	12:33469
104(1986)	NTIS (US Sales Only), PC A02/MF A01	DE87702316	MN -37	12:33533
108(1986)	NTIS (US Sales Only), PC A02/MF A01	DE87702317	MN -20	12:34330
110(1986)	NTIS (US Sales Only), PC A02/MF A01	DE87702318	MN -20	12:34331
145(1986)	NTIS (US Sales Only), PC A02/MF A01	DE87702319	MN -28	12:33470
ITEP-				
87(1986)	NTIS (US Sales Only), PC A02/MF A01	DE87702320	MN -34D	12:34125
IWGFR-				
61	NTIS (US Sales Only), PC A13/MF A01; 1	DE87900693	MN -79a	12:32808
JINR-				
8-86-368	NTIS (US Sales Only), PC A02/MF A01	DE87702321	MN -34A	12:33471
9-86-289	NTIS (US Sales Only), PC A02/MF A01	DE87702322	MN -28	12:33472
9-86-418	NTIS (US Sales Only), PC A02/MF A01	DE87702323	MN -28	12:33447
9-86-473	NTIS (US Sales Only), PC A02/MF A01	DE87702324	MN -28	12:33448
9-86-503	NTIS (US Sales Only), PC A02/MF A01	DE87702325	MN -28	12:33473
13-86-327	NTIS (US Sales Only), PC A02/MF A01	DE87702326	MN -37	12:33534
13-86-445	NTIS (US Sales Only), PC A02/MF A01	DE87702327	MN -37	12:33535
14-86-411	NTIS (US Sales Only), PC A02/MF A01	DE87702328	MN -34A	12:33203
D-13-85-793	NTIS (US Sales Only), PC A20/MF A01	DE87780145	MN -20	12:34156
JINR-D-				
1-86-422	NTIS (US Sales Only), PC A02/MF A01	DE87702329	MN -34D	12:34079
JINR-E-				
1-86-332	NTIS (US Sales Only), PC A02/MF A01	DE87702330	MN -34C	12:34080
2-86-268	NTIS (US Sales Only), PC A02/MF A01	DE87702331	MN -34D	12:34240
2-86-316	NTIS (US Sales Only), PC A02/MF A01	DE87702332	MN -34D	12:34126
2-86-355	NTIS (US Sales Only), PC A02/MF A01	DE87702333	MN -34D	12:34098
2-86-425	NTIS (US Sales Only), PC A02/MF A01	DE87702334	MN -34D	12:34127
2-86-432	NTIS (US Sales Only), PC A04/MF A01	DE87702335	MN -34D	12:34241
2-86-460	NTIS (US Sales Only), PC A02/MF A01	DE87702336	MN -34D	12:34128
4-86-242	NTIS (US Sales Only), PC A02/MF A01	DE87702337	MN -34D	12:34242
7-86-359	NTIS (US Sales Only), PC A02/MF A01	DE87702338	MN -34C	12:34169
10-86-430	NTIS (US Sales Only), PC A02/MF A01	DE87702339	MN -32	12:34427
11-86-266	NTIS (US Sales Only), PC A02/MF A01	DE87702340	MN -34D	12:34243
14-86-448	NTIS (US Sales Only), PC A02/MF A01	DE87702341	MN -34A	12:33205
JINR-R-				
1-86-239	NTIS (US Sales Only), PC A02/MF A01	DE87702342	MN -34C	12:34081
1-86-248	NTIS (US Sales Only), PC A02/MF A01	DE87702343	MN -37	12:33603
1-86-251	NTIS (US Sales Only), PC A02/MF A01	DE87702344	MN -34C	12:34082
1-86-254	NTIS (US Sales Only), PC A02/MF A01	DE87702345	MN -37	12:33604
1-86-300	NTIS (US Sales Only), PC A02/MF A01	DE87702346	MN -34C	12:34164
1-86-373	NTIS (US Sales Only), PC A02/MF A01	DE87702347	MN -34D	12:34083
1-86-435	NTIS (US Sales Only), PC A02/MF A01	DE87702348	MN -34C	12:34160
1-86-498	NTIS (US Sales Only), PC A02/MF A01	DE87702349	MN -34D	12:34084
2-86-33	NTIS (US Sales Only), PC A02/MF A01	DE87702350	MN -34D	12:34129
2-86-116	NTIS (US Sales Only), PC A02/MF A01	DE87702351	MN -34D	12:34244
2-86-202	NTIS (US Sales Only), PC A02/MF A01	DE87702352	MN -34D	12:34245
2-86-281	NTIS (US Sales Only), PC A02/MF A01	DE87702353	MN -34A	12:34043
2-86-307	NTIS (US Sales Only), PC A02/MF A01	DE87702354	MN -34D	12:34099
2-86-317	NTIS (US Sales Only), PC A02/MF A01	DE87702355	MN -34D	12:34130
2-86-399	NTIS (US Sales Only), PC A02/MF A01	DE87702356	MN -34C	12:34100
2-86-401	NTIS (US Sales Only), PC A02/MF A01	DE87702357	MN -34D	12:34101
2-86-408	NTIS (US Sales Only), PC A02/MF A01	DE87702358	MN -34C	12:34197
2-86-421	NTIS (US Sales Only), PC A02/MF A01	DE87702359	MN -34D	12:34102
2-86-423	NTIS (US Sales Only), PC A02/MF A01	DE87702360	MN -34D	12:34131
2-86-426	NTIS (US Sales Only), PC A02/MF A01	DE87702361	MN -34D	12:34103
2-86-436	NTIS (US Sales Only), PC A03/MF A01	DE87702362	MN -34D	12:34246
2-86-470	NTIS (US Sales Only), PC A02/MF A01	DE87702363	MN -34D	12:34247
3-86-184	NTIS (US Sales Only), PC A02/MF A01	DE87702364	MN -37	12:33605
4-86-346	NTIS (US Sales Only), PC A02/MF A01	DE87702365	MN -34D	12:34248
4-86-397	NTIS (US Sales Only), PC A02/MF A01	DE87702366	MN -34D	12:34104
4-86-442	NTIS (US Sales Only), PC A02/MF A01	DE87702367	MN -34D	12:34249
4-86-453	NTIS (US Sales Only), PC A02/MF A01	DE87702368	MN -34C	12:34198
4-86-515	NTIS (US Sales Only), PC A02/MF A01	DE87702369	MN -34D	12:34132
4-86-554	NTIS (US Sales Only), PC A02/MF A01	DE87702370	MN -34D	12:34250
6-86-320	NTIS (US Sales Only), PC A02/MF A01	DE87702371	MN -37	12:33606
6-86-394	NTIS (US Sales Only), PC A02/MF A01	DE87702372	MN -32	12:33607
6-86-404	NTIS (US Sales Only), PC A02/MF A01	DE87702373	MN -34C	12:34199
6-86-476	NTIS (US Sales Only), PC A03/MF A01	DE87702374	MN -34D	12:34085
9-86-290	NTIS (US Sales Only), PC A02/MF A01	DE87702375	MN -28	12:33451
10-86-261	NTIS (US Sales Only), PC A02/MF A01	DE87702376	MN -37	12:33608
10-86-412	NTIS (US Sales Only), PC A02/MF A01	DE87702377	MN -37	12:33609
10-86-472	NTIS (US Sales Only), PC A02/MF A01	DE87702378	MN -37	12:33610
10-86-556	NTIS (US Sales Only), PC A02/MF A01	DE87702379	MN -32	12:33611
11-86-526	NTIS (US Sales Only), PC A02/MF A01	DE87702380	MN -34D	12:34251
14-86-429	NTIS (US Sales Only), PC A02/MF A01	DE87702381	MN -34A	12:33253
15-86-454	NTIS (US Sales Only), PC A02/MF A01	DE87702382	MN -20	12:34161
19-86-416	NTIS (US Sales Only), PC A02/MF A01	DE87702383	MN -48	12:33938
19-86-417	NTIS (US Sales Only), PC A02/MF A01	DE87702384	MN -48	12:33939
JOPAG-				
04.86-PRG-128	NTIS (US Sales Only), PC A04/MF A01	DE87751899	MN -86	12:32516
JPL-PUB-				
86-49	*See* N-87-20055			12:34024
Juel-				
2067	NTIS (US Sales Only), PC A10/MF A01	DE87751907	MN -48	12:33892

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2080	NTIS (US Sales Only), PC A13/MF A01	DE87751904	MN -2	12:33031
2091	NTIS (US Sales Only), PC A07/MF A01	DE87751923	MN -80	12:32965
K/ETAC-				
7	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99: DE87008355	MN -38	12:33340
13/ S1	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE87009976	MN -37	12:33631
K/TS-				
11-862	NTIS, PC A07; 3	DE87009707	MN -22	12:32508
KFK-				
4075	NTIS (US Sales Only), PC A04/MF A01	DE87751922	MN -20d	12:34382
4086	NTIS (US Sales Only), PC A05/MF A01	DE87751914	MN -25	12:33157
4147	NTIS (US Sales Only), PC A06/MF A01	DE87751927	MN -11	12:33678
4178	NTIS (US Sales Only), PC A03/MF A01	DE87751928	MN -80	12:32872
4182	NTIS (US Sales Only), PC A06/MF A01	DE87751926	MN -80	12:32966
KIYI-				
86-3	NTIS (US Sales Only), PC A02/MF A01	DE87702385	MN -34C	12:34170
86-6	NTIS (US Sales Only), PC A02/MF A01	DE87702386	MN -34A	12:34044
86-9	NTIS (US Sales Only), PC A03/MF A01	DE87702387	MN -28	12:33490
86-23	NTIS (US Sales Only), PC A02/MF A01	DE87702388	MN -20	12:34334
KWU-R-				
917/ 86/ 107	*See* KFK-4182	DE87751926	MN -80	12:32966
LA-				
172/ 87	*See* OEFZS-4383	DE87702400	MN -51	12:33721
10944	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87009480	STD -10	12:33225
10963-MS	NTIS, PC A03/MF A01; 1	DE87009486	STD -10	12:32517
11004-T	NTIS, PC A10/MF A01; 1 (GPO Dep.)	E 1.99: DE87010839	STD -34C	12:34165
LA-UR-				
86-3996	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87002897	MN -4	12:33206
87-48	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87005119	MN -34C	12:32827
87-49	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87005118	MN -34C	12:34182
87-150	NTIS, PC A02; 3	DE87005105	MN -34	12:34045
87-214	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87005099	MN -25	12:33207
87-439	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87006056	MN -32	12:34068
87-1104	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87007504	MN -34C	12:34117
87-1196	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87008990	MN -34C	12:34086
87-1255	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE87008995	MN -34B	12:34105
87-1275	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE87008998	MN -48	12:33766
87-1294	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87009000	MN -34	12:34226
87-1348	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87009002	MN -34C	12:34087
87-1387	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87009007	MN -15	12:32592
87-1397	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE87009008	MN -34B	12:34008
87-1452	NTIS, PC A02; 3	DE87009012	MN -38	12:33414
87-1478	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87010097	MN -25	12:33158
87-1479	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87010098	MN -25	12:33159
87-1715	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87010127	MN -25	12:33160
87-1781	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87010135	MN -4	12:33226
87-1786	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87010136	MN -45	12:33643
87-1789	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87010137	MN -48	12:33768
87-1791	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87010138	MN -32	12:34450
87-1825	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87010140	MN -32	12:34428
87-1835	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87010096	MN -41	12:32511
LAPP-TH-				
146	NTIS (US Sales Only), PC A02/MF A01	DE87751808	MN -34D	12:34118
157	NTIS (US Sales Only), PC A03/MF A01	DE87752076	MN -34D	12:34106
LBL-				
18838	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE87009623	MN -59B	12:33073
21004	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87009155	MN -38	12:33074
21566	NTIS, PC A02; 3	DE87007180	MN -37	12:33612
21576	NTIS, PC A02; 3	DE87007609	MN -95d	12:33075
21800	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87006935	MN -38	12:33859
21874	NTIS MF A01; 2 (GPO Dep.)	E 1.99: DE87007612	MN -48	12:33860
21884	NTIS, PC A02; 3	DE87009150	MN -95c	12:33076
22109	*See* DOE/BP/13795-18	E 1.99: DE87009930	MN -95d	12:33060
22832	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87009277	STD -34C	12:33415
22841	NTIS MF A01; 2 (GPO Dep.)	E 1.99: DE87007610	MN -34D	12:34107
22924	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87007599	MN -34A	12:34227
22962	NTIS, PC A11/MF A01; 1 (GPO Dep.)	E 1.99: DE87009281	STD -48	12:33861
23116	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99: DE87009633	MN -11	12:32682
23228	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87009553	MN -34C	12:34200
23230	NTIS, PC A02; 3	DE87009619	MN -66a	12:32683
23255	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87010284	MN -25	12:33029
23258	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87009551	MN -34A	12:34228
23278	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87009625	MN -25	12:34069
23301	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE87010254	MN -11	12:33752
23367	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87010258	MN -4	12:33320
LMF-				
115	NTIS, PC A22/MF A01; 1 (GPO Dep.)	E 1.99: DE87009807	STD -48	12:33947
LPCC-				
86-02	NTIS (US Sales Only), PC A02/MF A01	DE87751802	MN -34C	12:34157
LYCEN-				
8518	NTIS (US Sales Only), PC A03/MF A01	DE87751836	MN -34C	12:34175
8576	NTIS (US Sales Only), PC A06/MF A01	DE87751822	MN -34C	12:34178
MandET/MRL-				
86-104(TR)	Canada Centre for Mineral and Energy Technology, Ottawa, Ontario			12:32469

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MEA-					
2200	*See* NUREG/CR-4841		TI87900674	MN -80	12:32838
2210	*See* NUREG/CR-4894		TI87900692	MN -80	12:32994
MLM-					
3422	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009388	STD -37	12:33644
3424	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99:	DE87010638	STD -4	12:33220
3425	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010639	STD -25	12:33161
3426	NTIS, PC A02; 3		DE87009248	STD -37	12:33632
3427	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99:	DE87010563	STD -41	12:32584
3434(OP)	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009201	MN -37	12:33645
3435	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE87010640	STD -4	12:33254
MRE-SM-					
07/ 86	NTIS (US Sales Only), PC A03/MF A01		DE87702389	MN -25	12:32837
N-					
87-17003	NTIS, PC A10/MF A01				12:33379
87-17398	NTIS, PC A14/MF A01				12:32650
87-17584	NTIS, PC A02/MF A01				12:34009
87-17849	NTIS, PC A16/MF A01				12:33133
87-18067	NTIS, PC A04/MF A01				12:33363
87-18668	NTIS, PC A02/MF A01				12:33185
87-18784	NTIS, PC A02/MF A01				12:33186
87-18786	NTIS, PC A02/MF A01				12:33380
87-19328	NTIS, PC A18/MF A01				12:34010
87-20055	NTIS, PC A20/MF A01				12:34024
4577-0901	*See* PB-87-176335/XAB				12:33078
NAGRA-NTB-					
85-19	Nagra, CH-5401 Baden, Switzerland			ND -70	12:32570
85-49	Nagra, CH-5401 Baden, Switzerland			ND -70	12:32571
NAS-					
1.15:88940	*See* N-87-18784				12:33186
1.15:89818	*See* N-87-18668				12:33185
1.15:89841	*See* N-87-18786				12:33380
1.26:4015	*See* N-87-17003				12:33379
1.26:4050	*See* N-87-18067				12:33363
1.26:171956	*See* N-87-17398				12:32650
1.26:178941	*See* N-87-17849				12:33133
1.26:180155	*See* N-87-17584				12:34009
1.26:180231	*See* N-87-20055				12:34024
1.55:2439	*See* N-87-19328				12:34010
NASA-CP-					
2439	*See* N-87-19328				12:34010
NASA-CR-					
4015	*See* N-87-17003				12:33379
4050	*See* N-87-18067				12:33363
171956	*See* N-87-17398				12:32650
175056	*See* DOE/NASA-4105-3	E 1.99:	DE87005495	STD -60	12:32687
178941	*See* N-87-17849				12:33133
180155	*See* N-87-17584				12:34009
180231	*See* N-87-20055				12:34024
NASA-TM-					
88940	*See* N-87-18784				12:33186
89818	*See* N-87-18668				12:33185
89841	*See* N-87-18786				12:33380
NEANDC(E)-					
231-L	NTIS (US Sales Only), PC A04/MF A01		DE87751807	MN -34	12:34429
NERDDP-EG-					
84/ 358	Department of Resources and Energy, GPO Box 858, Canberra, ACT 2601, Australia				12:32464
NIIAR-					
15(696)	NTIS (US Sales Only), PC A02/MF A01		DE87702390	MN -86	12:32518
17(698)	NTIS (US Sales Only), PC A02/MF A01		DE87702391	MN -25	12:33163
NIIEFA-P-A-					
0678	NTIS (US Sales Only), PC A02/MF A01		DE87702392	MN -28	12:33491
0726	NTIS (US Sales Only), PC A03/MF A01		DE87702393	MN -20	12:34383
NIIEFA-P-B-					
0683	NTIS (US Sales Only), PC A02/MF A01		DE87702394	MN -20	12:34384
NIIEFA-P-D-B-					
0689	NTIS (US Sales Only), PC A02/MF A01		DE87702395	MN -28	12:33492
NIIEFA-P-SIU-					
0717	NTIS (US Sales Only), PC A03/MF A01		DE87702396	MN -28	12:33493
NIIEFA-P-V-					
0700	NTIS (US Sales Only), PC A02/MF A01		DE87702397	MN -28	12:33494
0728	NTIS (US Sales Only), PC A02/MF A01		DE87702398	MN -28	12:33452
NMRDI-					
2-74-4324	NTIS, PC A04/MF A01 - NMERDI-Univ. of New Mexico, 457 Washington S.E., Albuquerque, NM 87108; 1		DE87900773	MN -132	12:32485
NP-					
7900660	US Fish and Wildlife Service, 1010 Gause Blvd., Slidell, LA 70458		TI87900660	MN -11	12:33765
7900687	Applied Solar Energy Corp., 15251 E. Don Julian Road, City of Industry, CA 91746		TI87900687	MN -63c	12:32634
7900733	NTIS (US Sales Only), PC A05/MF A01; 1		DE87900733	MN -61D	12:32613

Report Number	Availability Source	File Number		Distribution Category	Abstract Number
7900759	U.S. Fish and Wildlife Service, 1010 Gause Blvd., Slidell, LA 70458		TI87900759	MN -11	12:33742
7900770	NTIS (US Sales Only), PC A03/MF A01; 1		DE87900770	MN -61	12:32635
NRL-F-					
65	NTIS (US Sales Only), PC A02/MF A01		DE87900737	MN -41	12:33679
NUREG-					
0020-Vol.10-No.8	NTIS, PC A19/MF A01 - GPO		TI87900841	MN -80	12:32750
0090-Vol.9-No.3	NTIS, PC A04/MF A01 - GPO		TI87900690	MN -80	12:32813
0750-Vol.24-No.4	NTIS, PC A09/MF A01 - GPO		TI87900639	MN -80	12:33032
0750-Vol.24-No.5	NTIS, PC A05/MF A01 - GPO		TI87900689	MN -80	12:32814
1002-Suppl.3	NTIS, PC A03/MF A01 - GPO		TI87900730	MN -78	12:32967
1235	NTIS, PC A24/MF A01 - GPO		TI87900641	MN -78	12:32751
1261	NTIS, PC A21/MF A01; 1		TI87900736	MN -78	12:32968
1265	NTIS, PC A09/MF A01 - GPO		TI87900729	MN -80	12:32969
1271	NTIS, PC A04/MF A01 - GPO		TI87900637	MN -78	12:34403
NUREG/CR-					
2000-Vol.6-No.3	NTIS, PC A06/MF A01 - GPO		TI87009307	MN -80	12:32815
3956	NTIS, PC A03/MF A01 - GPO		TI87010040	MN -78	12:32800
3961	NTIS, PC A03/MF A01 - GPO		TI87900394	MN -80	12:32986
4219-Vol.3-No.2	NTIS, PC A11/MF A01 - GPO		TI87003566	MN -78	12:32752
4550-Vol.5	NTIS, PC A18/MF A01 - GPO		TI87009189	MN -78	12:32987
4551-Vol.2	NTIS, PC A22/MF A01 - GPO		TI87010289	MN -78	12:32988
4623	NTIS, PC A99 - GPO		DE87900677	MN -80	12:32875
4655	NTIS, PC A21/MF A01 - GPO		TI87900734	MN -70	12:32572
4719	NTIS, PC A04/MF A01 - GPO		TI87010031	MN -79	12:32989
4762	NTIS, PC A99/MF A01 - GPO		TI87007080	MN -78	12:32990
4769	NTIS PC E08/MF 5.95 - GPO		TI87008901	MN -78	12:32991
4800	NTIS, PC A04/MF A01 - GPO		TI87010002	MN -80	12:34430
4821	NTIS, PC A04/MF A01 - GPO		TI87010214	MN -78	12:32992
4841	NTIS, PC A04/MF A01 - GPO		TI87900674	MN -80	12:32838
4842	NTIS, PC A08/MF A01 - GPO		TI87006957	MN -70	12:33208
4872	NTIS, PC A08/MF A01 - GPO		TI87900678	MN -78	12:32839
4877	NTIS, PC A05/MF A01 - GPO		TI87900636	MN -78	12:32753
4878	NTIS, PC A09/MF A01 - GPO		TI87900672	MN -38	12:33164
4889	NTIS, PC A03/MF A01 - GPO		TI87008841	MN -80	12:33165
4890	NTIS, PC A03/MF A01 - GPO		TI87008601	MN -78	12:32993
4894	NTIS, PC A03/MF A01 - GPO		TI87900692	MN -80	12:32994
4918-Vol.1	NTIS, PC A03/MF A01 - GPO		TI87900644	MN -70B	12:32573
NYSERDA-					
86-13	NTIS, PC A06; 3		DE87900661	MN -37	12:33613
NZERDC-					
124	NTIS (US Sales Only), PC A03/MF A01; 1		DE87900754	MN -61D	12:32608
NZERDC-P-					
97	NTIS (US Sales Only), PC A02/MF A01		DE87900750	MN -113	12:32447
98	NTIS (US Sales Only), PC A03/MF A01; 1		DE87900745	MN -116	12:32470
99	NTIS (US Sales Only), PC A10/MF A01; 1		DE87900743	MN -98B	12:33050
103	NTIS (US Sales Only), PC A08/MF A01; 1		DE87900742	MN -95d	12:33051
105	NTIS (US Sales Only), PC A02/MF A01		DE87900749	MN -114	12:32473
106	NTIS (US Sales Only), PC A03/MF A01; 1		DE87900748	MN -105	12:32466
115	NTIS, PC A04/MF A01; 1		DE87900819	MN -98	12:33040
OEFZS-					
4365e	NTIS (US Sales Only), PC A03/MF A01		DE87702399	MN -2	12:34404
4383	NTIS (US Sales Only), PC A04/MF A01		DE87702400	MN -51	12:33721
4384	NTIS (US Sales Only), PC A02/MF A01		DE87702401	MN -2	12:32995
4386	NTIS (US Sales Only), PC A02/MF A01		DE87702402	MN -23	12:34401
ORNL-					
6315	NTIS, PC A13/MF A01 (GPO Dep.)	E 1.99:	DE87010141	STD -41	12:33680
6340	NTIS, PC A13/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010142	MN -32	12:34405
6366	NTIS, PC A06/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009799	STD -38	12:33388
6378	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009770	MN -41	12:33941
ORNL/DSRD/TM-					
2	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010143	MN -32	12:34431
ORNL/NSIC-					
200-Vol.6-No.3	*See* NUREG/CR-2000-Vol.6-No.3		TI87009307	MN -80	12:32815
ORNL/SUB-					
83-47977/ 01	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010223	MN -101	12:33166
85-97368/ 3	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE87002965	MN -70	12:32574
ORNL/TM-					
9593-Vol.3-No.2	*See* NUREG/CR-4219-Vol.3-No.2		TI87003566	MN -78	12:32752
10000	NTIS, PC A09; 3		DE87009109	MN -70	12:33978
10224	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010145	STD -20g	12:34339
10276	NTIS, PC A03/MF A01		DE87004020	MN -80	12:32883
10302	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE87008567	STD -79d	12:32809
10306	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87004034	MN -80	12:32884
10390	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87008541	MN -80	12:32885
10412	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010148	STD -20g	12:34340
10472	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010421	MN -48	12:33948
ORO-					
4207-19	*See* DOE/ER/04207-19	E 1.99:	DE87007767	MN -78	12:32877
PAR-LPTHE-					
86-09	*See* LAPP-TH-157		DE87752076	MN -34D	12:34106
PATENTS-US-	(US: Commissioner of Patents, Washington, DC 20231, USA, $1.50 per copy.)				
4,607,852					12:33354

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4,657,646				12:32605
4,657,723				12:34392
4,657,729				12:32840
4,657,747				12:34393
4,657,877				12:33190
4,658,208				12:32486
4,658,216				12:33639
4,658,222				12:33619
4,661,304				12:34391
A 6-685,081		E 1.99: DE87007261	MN -38	12:32846
A 6-796,464		E 1.99: DE87007271	MN -38	12:33360
A 6-800,563		E 1.99: DE87007274	MN -37	12:33642
A 6-800,631		E 1.99: DE87007280	MN -38	12:33359
A 6-802,874		E 1.99: DE87007283	MN -38	12:33177
A 6-817,934		E 1.99: DE87007289	MN -38	12:34066
A 6-827,703		E 1.99: DE87007296	MN -38	12:33371
A 6-844,035		E 1.99: DE87007221	MN -38	12:33499
A 6-848,001		E 1.99: DE87007225	MN -38	12:33358
A 6-855,529		E 1.99: DE87007237	MN -38	12:33466
A 6-859,166		E 1.99: DE87007242	MN -38	12:33357
A 6-861,380		E 1.99: DE87007245	MN -38	12:33430
A 6-863,331		E 1.99: DE87007248	MN -38	12:33356
A 6-868,478		E 1.99: DE87007184	MN -38	12:33233
A 6-881,310		E 1.99: DE87007193	MN -37	12:33641
A 6-892,990		E 1.99: DE87007203	MN -37	12:33640
A 6-894,523		E 1.99: DE87007206	MN -38	12:33355
A 6-898,083		E 1.99: DE87007209	MN -38	12:33624
A 6-899,122		E 1.99: DE87007211	MN -37	12:33411
PB-				
87-160057/ XAB	NTIS, PC A06/MF A01			12:32495
87-160701/ XAB	NTIS, PC A03/MF A01			12:33124
87-161154/ XAB	NTIS, PC A07/MF A01			12:33125
87-161170/ XAB	NTIS, PC A03/MF A01			12:33656
87-161188/ XAB	NTIS, PC A09/MF A01			12:33750
87-164448/ XAB	NTIS, PC A03/MF A01			12:32504
87-165106/ XAB	NTIS, PC A07/MF A01			12:33949
87-165403/ XAB	NTIS, PC A07/MF A01			12:32496
87-166948/ XAB	NTIS, PC A02/MF A01			12:33866
87-167763/ XAB	NTIS, PC A02/MF A01			12:33950
87-168407/ XAB	NTIS, PC A08/MF A01			12:32448
87-169603/ XAB	NTIS, PC A07/MF A01			12:33657
87-170148/ XAB	NTIS, PC A03/MF A01			12:33126
87-172805/ XAB	NTIS, PC A08/MF A01			12:33077
87-173811/ XAB	NTIS PC PC E99			12:33129
87-173829/ XAB	NTIS, PC A10/MF A01			12:33130
87-173837/ XAB	NTIS, PC A08/MF A01			12:33131
87-176319/ XAB	NTIS, PC A06/MF A01			12:32501
87-176335/ XAB	NTIS, PC A06/MF A01			12:33078
87-176350/ XAB	NTIS, PC A03/MF A01			12:33079
87-177168/ XAB	NTIS, PC A04/MF A01			12:33049
87-178307/ XAB	NTIS, PC A09/MF A01			12:33023
87-178315/ XAB	NTIS, PC A05/MF A01			12:33715
87-180485/ XAB	NTIS, PC A03/MF A01			12:33024
87-181327/ XAB	NTIS, PC A12/MF A01			12:33025
87-181954/ XAB	NTIS, PC A05/MF A01			12:32500
PER-				
96	NTIS (US Sales Only), PC A03/MF A01	DE87702403	MN -51	12:32505
97	NTIS (US Sales Only), PC A08/MF A01	DE87702404	MN -51	12:32506
PNL-				
6100-Pt.1	NTIS, PC A06/MF A01; 1 (GPO Dep.)	E 1.99: DE87010024	MN -48	12:33942
6144	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99: DE87010265	MN -95f	12:33187
6165	*See* NUREG/CR-4890	TI87008601	MN -78	12:32993
6166	*See* NUREG/CR-4889	TI87008841	MN -80	12:33165
6206-Vol.1	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE87010326	STD -85	12:32523
POEF-T-				
3446	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99: DE87008927	MN -37	12:32509
QR-				
2	*See* N-87-17849			12:33133
RCA-PRRL-				
86-CR-4	*See* N-87-18067			12:33363
RFP-				
3995	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE87009470	STD -38	12:33343
4007	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99: DE87010346	STD -25	12:33167
4110	NTIS MF A01; 2 (GPO Dep.)	E 1.99: DE87008695	MN -80	12:32873
RHO-RE-EV-				
95-P	NTIS, PC A06/MF A01; 1 (GPO Dep.)	E 1.99: DE87009438	MN -78	12:32996
RI/RD-BD-				
86-149	*See* N-87-17849			12:33133
RS-				
287/ 87	*See* OEFZS-4384	DE87702401	MN -2	12:32995
SAND-				
84-1643-Rev.	NTIS, PC A07/MF A01; 1 (GPO Dep.)	E 1.99: DE87010520	MN -70	12:34451
84-2275	NTIS, PC A04/MF A01; 1	DE87009349	MN -70	12:32589
85-1580	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99: DE87010521	MN -70	12:32575

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85-2316-Rev.	NTIS, PC A05/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009978	STD -62	12:32660
86-0344	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010154	MN -37	12:33364
86-1043	*See* NUREG/CR-4719		TI87010031	MN -79	12:32989
86-1309-Vol.2	*See* NUREG/CR-4551-Vol.2		TI87010289	MN -78	12:32988
86-1651C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87005843	MN -38	12:33646
86-1652C	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE87008643	MN -38	12:33324
86-1922	NTIS, PC A09/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010526	MN -32	12:34432
86-2084-Vol.5	*See* NUREG/CR-4550-Vol.5		TI87009189	MN -78	12:32987
86-2101C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87005884	MN -38	12:33344
86-2302	NTIS, PC A13/MF A01; 1 (GPO Dep.)	E 1.99:	DE87008894	MN -70	12:32576
86-2377	*See* NUREG/CR-4762		TI87007080	MN -78	12:32990
86-2560C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87008524	MN -15	12:32593
86-2589C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87007849	MN -38	12:33325
86-2604C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87003498	MN -37	12:33345
86-2646C	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99:	DE87009543	MN -38	12:33209
86-2674	NTIS, PC A13/MF A01; 1 (GPO Dep.)	E 1.99:	DE87008890	MN -70	12:32577
86-2719C	NTIS, PC A02; 3		DE87006710	MN -37	12:33416
86-2785C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87003032	MN -38	12:33417
86-2910C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010429	MN -25	12:33188
86-7042	NTIS, PC A05/MF A01; 1 (GPO Dep.)	E 1.99:	DE87007952	MN -63	12:32656
86-7052	NTIS, PC A06/MF A01; 1 (GPO Dep.)	E 1.99:	DE87007951	MN -63c	12:32636
86-7135	NTIS, PC A05/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009354	MN -70	12:32524
86-8060	NTIS, PC A07/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009804	MN -62a	12:32657
87-0037	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010157	MN -38	12:33346
87-0049	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010530	MN -13	12:33227
87-0064	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009355	MN -94a	12:33228
87-0098-Vol.1	NTIS, PC A11/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009239	STD -80	12:32886
87-0132C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009298	MN -34	12:32578
87-0140C	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE87005530	MN -21	12:34385
87-0185	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99:	DE87010625	MN -32	12:34433
87-0260C	NTIS MF A01; 2 (GPO Dep.)	E 1.99:	DE87006133	MN -34A	12:34229
87-0299C	NTIS, PC A02; 3		DE87005857	MN -37	12:33621
87-0361C	NTIS, PC A02; 3		DE87005856	MN -25	12:33210
87-0364C	NTIS, PC A02; 3		DE87006127	MN -32	12:34434
87-0401C	NTIS, PC A02; 3		DE87006126	MN -38	12:33347
87-0446C	NTIS, PC A02; 3		DE87006706	MN -37	12:33622
87-0505C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87007084	MN -38	12:33389
87-0525C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87007085	MN -38	12:33390
87-0554	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010533	MN -4	12:33229
87-0572C	NTIS, PC A02; 3		DE87006898	MN -38	12:33381
87-0795	NTIS, PC A03/MF A01 (GPO Dep.)	E 1.99:	DE87010536	MN -25	12:33168
87-0872	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE87010537	MN -32	12:34435
87-0883C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009836	MN -45	12:33647
87-0890	NTIS, PC A02/MF A01 (GPO Dep.)	E 1.99:	DE87010538	MN -13	12:33418
87-0921C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010036	MN -66	12:33987
87-1113C	NTIS, PC A02/MF A01; 1		DE87008967	MN -63d	12:32652
87-1120	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009535	MN -20g	12:34386
87-1214C	IEEE, 345 E 47th St., New York, NY 10017; 3		TI87009498	ND -63	12:32637
87-1253C	NTIS, PC A02; 3		DE87009834	MN -66	12:32673
87-1347C	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009730	MN -13	12:34402
87-7007	NTIS, PC A07/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010158	MN -63	12:32638
87-7098	NTIS, PC A05/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009357	MN -63	12:32639
87-8177-Vol.3	NTIS, PC A09; 3		DE87009377	MN -62a	12:32658
87-8206	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99:	DE87007899	MN -38	12:33169
SERI/PR-					
211-3073	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE87001152	MN -63	12:32640
SERI/STR-					
211-3084	NTIS MF A01; 2 (GPO Dep.)	E 1.99:	DE87001144	STD -63	12:32641
211-3097	NTIS, PC A05/MF A01; 1 (GPO Dep.)	E 1.99:	DE87001146	STD -63	12:32642
211-3104	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99:	DE87001142	STD -63	12:32643
211-3105	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99:	DE87001157	STD -63	12:32644
211-3107	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99:	DE87001143	STD -63	12:32645
211-3114	NTIS, PC A04/MF A01; 1 (GPO Dep.)	E 1.99:	DE87001145	STD -63	12:32646
SLAC-					
306	NTIS, PC A14; 3		DE87010325	STD -34D	12:34072
309	NTIS, PC A04; 3		DE87010324	STD -32	12:34436
312	NTIS, PC A99/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009268	STD -34D	12:34073
SLAC-PUB-					
4218	NTIS, PC A02/MF A01; 1 (GPO Dep.)	E 1.99:	DE87008874	MN -28	12:33495
4253	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE87008325	MN -34D	12:34108
SPhT-					
86-001	*See* CEA-CONF-8314		DE87751806	MN -34D	12:34237
ST-					
143/ 87	*See* OEFZS-4383		DE87702400	MN -51	12:33721
THE-R-					
814-D	Consultancy Services Wind Energy Developing Countries (CWD), P.O. Box 85, 3800 AB Amersfoort, Netherlands			ND -38	12:33348
TR-					
4	*See* AD-A-178907/2/XAB				12:33193
TVA/OACD/BIO-					
87/ 7	NTIS, PC A09/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009367	MN -61F	12:32614
TVA/OP/CEM-					
87/ 44	NTIS, PC A05/MF A01; 1		DE87900683	MN -95	12:33034

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TVA/OP/EDT-					
87/ 18	*See* DOE/NE/34133-1		DE87008560	STD -78	12:32818
UAH-RR-					
473	*See* PB-87-177168/XAB				12:33049
UCID-					
20644	NTIS, PC A07/MF A01; 1 (GPO Dep.)	E 1.99:	DE87010622	MN -41	12:33614
20679	*See* NUREG/CR-4800		TI87010002	MN -80	12:34430
20923	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE87003601	MN -38	12:33391
20945	NTIS, PC A07/MF A01; 1 (GPO Dep.)	E 1.99:	DE87009796	MN -11	12:33649
20997	NTIS, PC A03/MF A01; 1 (GPO Dep.)	E 1.99:	DE87007524	MN -38	12:33382
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